DOCUMENT RESUME

ED 295 582 IR 013 175

TITLE Telecommunications Policy Research Conference. Subsidies in Telephone Pricing Section. Papers.
INSTITUTION Telecommunications Policy Research Conference, Inc., Washington, DC.
PUB DATE Sep 87
NOTE 98p.; Papers presented at the Telecommunications Policy Research Conference (15th, Airlie, VA, September 27-30, 1987). For the conference program and additional papers, see IR 013 160-182.
PUB TYPE Reports - Descriptive (141) -- Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS Grants; *Low Income Groups; *Rural Areas; Tables (Data); *Telephone Communications Industry; *Telephone Communications Systems
IDENTIFIERS *Illinois; Pricing; *Rural Electrification

ABSTRACT

Three papers consider the provision of telephone service to rural and/or low income customers. The first paper, "An Analysis of Telephone Penetration" (Alexander Belinfante), analyzes the relationship between telephone penetration (the proportion of households with phone service) and prices, household income, and other factors. This study found that the majority of households without telephone service are low income, and it is suggested that subsidies or some other form of special consideration are needed for these households. Twelve tables and two graphs displaying the data for the study are appended. The second paper, "The Illinois Lifeline Experience: Using Value of Service To Implement Universal Service" (Perry J. Pockros), tracks the development of a targeted lifeline subsidy to low-income households as part of a locally measured service restructuring agreement in Chicago and eastern Illinois, and considers various subsidy proposals for their likely impact on subscription level. The third paper, "Telephone Subsidization in Rural Areas" (Joseph P. Fuhr), examines the history of the Rural Electrification Administration (REA) in the telephone industry, the structure of rural telephone companies and their customers, and the subsidies that REA borrowers have received and continue to receive. Finally, the paper examines the future of the rural telephone company and develops some policies which would help achieve universal telephone service. (Author/EW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED295582

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

TELECOMMUNICATIONS POLICY RESEARCH CONFERENCE

Subsidies in Telephone Pricing Section

Airlie, Virginia

September 27-30, 1987

IR013175

BEST COPY AVAILABLE

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Edward Zajec

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

An Analysis of Telephone Penetration

By Alexander Belinfante

Industry Analysis Division
Common Carrier Bureau
Federal Communications Commission
Washington, D.C. 20554

Presented at the
Fifteenth Annual
Telecommunications Policy Research Conference
Airlie House, Virginia
September 29, 1987

Any conclusions or opinions expressed in the paper are those of the author and do not necessarily reflect the views of the Federal Communications Commission or any organization within the Commission.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Edward Zajec

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Alexander Belinfante

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

IR013175

Tues 3:30

SUBSIDIES IN TELEPHONE PRICING
Chair: Jules Joskow

Alexander Belinfante: An Analysis of Telephone Penetration

The last several years have seen substantial changes in the way telephone service is priced. In an attempt to implement cost-based pricing, fixed charges for service have gone up while usage charges for long-distance calls have come down. One of the concerns about implementing these charges is their impact on low income households.

This paper will analyze the relationships between telephone penetration (the proportion of households with phone service) and prices, household income, and other factors. The statistical regressions analysis is based on household data from the Current Population Survey and price data from the telephone companies.

Previous studies have shown that the majority of households without telephone service are low-income households. This is the basis of proposals to provide some form of subsidy and/or other special considerations to these households. This paper should provide further evidence in support of such policies.

0131/75

Introduction

The last several years have seen substantial changes in the way telephone service is priced. In an attempt to implement cost-based pricing, fixed charges for service have gone up while usage charges for long-distance calls have come down. One of the concerns about implementing these charges is their impact on low income households.

This paper analyzes the relationships between telephone penetration (the proportion of households with phone service) and prices, household income, and other factors. The paper begins with a discussion of recent statistics on telephone penetration from the Current Population Survey. This is followed by a statistical regression analysis based on household data form the Current Population Survey and price data from the telephone companies.

Previous studies have shown that the majority of households without telephone service are low-income households. This is the basis of proposals to provide some form of subsidy and/or other special considerations to these households. This paper provides further evidence in support of such policies.

1. Subscribership and Penetration Levels

The number of households and the percentage of households that have telephone service represent the most basic measures of the extent of universal service. Continuing analysis of telephone penetration statistics allows us to examine the aggregate effects of Commission actions on households' decisions to maintain, acquire or drop telephone service. This section presents comprehensive data on telephone penetration statistics collected by the Bureau of the Census under contract with the FCC. Along with telephone penetration statistics for the United States and each of the states from November 1983 to July 1987, data are provided on penetration based on various demographic characteristics.

Prior to the 1980s, precise measurements of telephone subscribership received little attention. The most widely used measure of telephone availability is the percentage of households with telephone service --sometimes called a measure of telephone "penetration". This statistic, however, can be subject to large measurement errors. Traditionally, telephone penetration was measured by dividing the number of residential telephone lines by the number of households. With some households adding second telephone lines and with an increasing number of second homes, measures of penetration based on the number of residential lines became subject to a large margin of error.

By 1980, the traditional penetration measure (residential lines divided by the number of households) reached 96% while the number of households reporting telephones in the 1980 census was slightly less than 93%. Recognizing the need for precise periodic measurements of subscribership, the Federal Communications Commission requested that the Bureau of the Census include questions on telephones as part of its Current Population Survey (CPS), which monitors demographic trends between the decennial censuses. This survey is a staggered panel survey in which the people residing at particular addresses are included for four consecutive months in one year and the same four months in the following year. It is staggered in that one-eighth of the sample is replaced every month. Use of the Current Population Survey has several advantages -- it is conducted every month by an independent and expert agency, the sample is large and the questions are consistent. Thus, changes in the results can be compared over time with a great deal of confidence.

Unfortunately, the results of the Current Population Survey cannot be directly compared with the penetration figures contained in the 1980 decennial census. This is because differences in the sampling methodologies exist and because of the context in which the questions were asked.

The specific questions asked in the Current Population Survey are: "Is there a telephone in this house/apartment?" and, if the answer to the first question is "no", "Is there a telephone elsewhere on which people in this household can be called?" Although the survey is conducted every month, not all questions are asked every month. The telephone questions are asked once every four months, in the month that a household is first included in the sample and in the month that the household reenters the sample a year later. Since the sample is staggered, the information that is reported for any given month actually reflects responses over the preceding four months. Aggregated summaries of the responses are reported to the FCC, based on the surveys conducted through March, July, and November of each year. These reports are generally released approximately two months after the final month of each four month survey period.

The data show that no significant change has occurred in the percentage of households subscribing to telephone service for the past year. As a result of an increasing number of households, 1.2 million households were added to the nation's telephone system between July 1986 and July 1987.

Census Bureau figures for July 1987 indicate that 92.3% of all households in the U.S. have a telephone. 1 The level of subscribership increased 0.1% from the previous July report. The subscribership level declined 0.2% from the March 1987 report. Neither of these changes is statistically significant. Because there is an overlap of half of the sample from year to year, but no overlap in the sample between surveys that are four months apart, annual changes are less subject to variations in sampling error.

This report includes figures showing subscribership percentages by state, by householder's age and race, by household size, by family income, and for individual persons by labor force status. The data for individual persons show that 93.4% of those adults in the civilian noninstitutionalized population have a telephone in their household. This figure is unchanged from July 1986 and down 0.2% from March 1987. This change is also not statistically significant.

This section contains thirteen tables and charts presenting penetration statistics broken out for various geographic and demographic characteristics. They are here summarized seritatim:

Table 1.1 summarizes the telephone penetration for the United States, combining information on the number of households with the penetration rates.

Table 1.2 shows the Current Population Survey responses for the United States and for each state for the period from November 1983 through July 1987. Because the Current Population Survey began collecting this data only in 1983, comparable values are not available prior to November 1983. For each of the surveys, the column headed "Unit" indicates the percentage of households for which the response to the first question was "yes". The column headed "Avail." indicates the percentage of households which responded "yes" to either the first or the second question. The annual averages are the average of the 3 surveys of the year in question.

---

1 As noted above, the Census Bureau figures released for March, July, and November each year are actually based on the four month period ending in the named month, rather than only on data collected during that month. Thus, a more technically correct description is that, during the four months ending in July 1987, the nationwide penetration rate was 92.3%.

Chart 1.1 depicts the nationwide penetration rates for households graphically, with the values taken from the top line of Table 1.2.

Table 1.3 shows the nationwide penetration rates for households by the age and race of the householder. It shows that the penetration rate is lowest for young and non-white households.

Table 1.4 shows the nationwide penetration rates for households by the size of the household and the race of the householder. It shows that penetration is highest for households of 2 to 5 people.

Table 1.5 shows the nationwide penetration rates for households by family income and the race of the householder. It shows a strong relationship between income and penetration.

Table 1.6 shows the nationwide penetration rates for all persons at least 16 years old in the civilian noninstitutionalized population by their race and employment status. Since this table is for individuals rather than households, the total penetration rates are different from those in the previous tables. It shows that penetration is lowest among the unemployed.

Chart 1.2 depicts the nationwide penetration rates for individuals graphically, with the values taken from the totals in Table 1.6.

Tables 1.7-1.11 present the critical values for the earlier Tables. The Census Bureau data are based on a nationwide sample of about 58,000 households. Because a sample is used, the estimates are subject to sampling error. For the nationwide totals, the critical value for determining a significant difference in telephone penetration over time is 0.5% (at the 95% confidence level). For individual states, the amount of sampling variability is much greater. These critical values are shown in Table 1.7 and are relevant because changes less than or equal to the values shown are likely to be due to sampling error and thus cannot be regarded as demonstrating that a change in telephone penetration has occurred. When comparing the annual averages, the critical values should be multiplied by 0.5774, since these are based on three surveys and hence have a lower standard error. Tables 1.8, 1.9, 1.10 and 1.11 show the corresponding critical values for testing for significant differences over time for the penetration rates shown in Tables 1.3, 1.4, 1.5, and 1.6, respectively. In some cases these critical values are very large because the sample sizes are very small for these subcategories, rendering the estimated penetration rates unreliable.

2. Regression Analysis

Under contract from the FCC, the Census Bureau in its Current Population Survey asks households whether there is a telephone in their living quarters. In its March survey many other economic and demographic

questions are asked. The analysis here is based on the March 1984 and March 1985 surveys.

To carry out the analysis, the sample observations (58,679 for March 1984 and 59,274 for March 1985) were divided into 201 census regions. These consists of the larger cities, their suburbs, aggregations of smaller SMSAs, divided between central cities and suburbs, and nonurban areas. Each of the 201 regions falls entirely within one state. The regions are listed in Table 1.

The dependent variable is telephone penetration, i.e. the proportion of households with a telephone. Since this variable is limited to a range of 0 to 1, a simple linear regression is not appropriate. Instead, a logistics curve model is used. If Z is telephone penetration and Y is a linear function of the independent variables, the model takes the form

$$Z = eY /(1 + eY) \quad \text{or} \quad Y = \log (Z/(1-Z)).$$

This model assumes that Z asymptotically approaches 1. It breaks down if Z = 1 since log 0 is not finite. In our sample, there were 3 observations (all in 1985) for which the sample proportion was 1. Since it is not believed that the population proportion is really 1, the sample value in those cases was replaced by 1 - 1/2n where n is the sample size.

The above model is similar to a logit model, except that the observations are for groups of households rather than individual households. The use of a logit model for this type of data has been extensively explored by Perl. 2 Rather than try to duplicate his efforts, the goal here is to try to analyze the data without taxing the limited capabilities of the available computer hardware and software. (Attempts to do logit regression quickly ran into memory size constraints.)

Since the observations used in our analysis are based on groups of sample households, and since the sizes of these sample groups vary substantially (from 45 to 1874), it can be expected that the variance of the observations will be inversely related to the sizes of the sample groups. This is a clear case of heteroscedasticity, which can easily be treated by using weighted regression, using the sizes of the sample groups as weights. This was implemented by multiplying both sides of the regression equation by the square root of the sample group size and using standard regression

---

2 Lewis J. Perl: "Residential Demand for Telephone Service 1983," National Economic Reserach Associates, Inc., prepared for the Central Services Organization, Inc., of the Bell Operating Companies, December 16, 1983.

programs on the modified equation. 3 Straightforward application of this procedure would result in the intercept being replaced by the variable weighting factor. However, as Draper and Smith 4 note, it is not necessarily appropriate to estimate a weighted least squares regression equation without an intercept unless that intercept proves to be empirically statistically insignificant. Therefore, an intercept was used, and since it had a significant t-statistic, it was retained.

Some fairly simple models have been estimated using this data, starting with a model with just income and price. The INCOME variable used is the mean household income (in thousands of dollars per year) for the geographic region. For the 1985 observations, these two variables were deflated by the factor 1.0374, the relative value of the Consumer Price Index (for all items) in March 1985 compared to March 1984. Letting W be the square root of the sample group size the results of the weighted regression are:

$$\begin{array}{lllll} Y * W = 5.05 + .410\ W + .0822\ INCOME*W - .0403\ PRLOW * W \\ \qquad\quad (3.79)\ (2.50) \quad (15.72) \qquad\qquad (2.82) \end{array}$$

Where the values in parentheses are t-statistics. This regression has a coefficient of determination R2 =.75. As can be seen from the t-statistics, the income variable is much more significant than the price variable. The magnitudes of the coefficients are similar to those found by Perl.

Since Table 1.4 shows that large households have a low penetration rate, a modification of the above model was tried, adjusting income for household size. This was done by multiplying the income of each household by the factor 3/(NP+2), where NP is the number of people in the household. This factor was derived from the fact that the poverty-line income for multiperson households increases by about one-third of the poverty-line income of a single-person household for each additional person in the household. (The factor has a value of 1 for a single-person household and decreases as the household size increases.) Thus, the variable INCADJ is

---

3 Attempts to use a more sophisticated generalized least squares program ran into computer memory size constraints. A comparison showing that the results from weighted least squares are superior to the results from ordinary least squares in this case can be found in Alexander Belinfante, "An Analysis of Telephone Penetration Using Weighted Principal Components Regression", May 1987.

4 Norman Draper and Harry Smith: Applied Regression Analysis, 2nd Edition (John Wiley & Sons, 1981), Sec. 2.11 (pp. 108-116) and Sec. 6.9 (pp. 327-332).

the mean income adjusted for household size for the geographic region. Replacing INCOME in the above regression by INCADJ yields the following results:

$$Y*W = \underset{(3.49)}{4.82} + \underset{(2.61)}{.456}\ W + \underset{(14.31)}{.124}\ INCADJ * W \underset{(2.71)}{-.0399}\ PRLOW * W$$

Since R2 for this regression is only .73, the fit is not as good as for the first regression. Thus, it appears that for a simple model it is better to use INCOME than INCADJ.

Another refinement of the model that was attempted was to add the variable PRINST, the base price for installation of service (service order and central office connection with no premises visit) in the geographic region. Again, the 1985 prices were deflated. The resulting regression estimates are:

$$Y*W = \underset{(3.77)}{5.04} + \underset{(1.96)}{.382W} + \underset{(15.48)}{.0825}\ INCOME* W \underset{(2.83)}{-.0405}\ PRLOW * W + \underset{(0.27)}{.00062}\ PRINST * W$$

The coefficient of PRINST is not significantly different from zero, and does not have the expected (negative) sign. This result differs from Perl's, who found a significant effect of installation price.

3. Conclusions

The information presented here, as shown in Table 1.5 and in the regression analysis, clearly shows the strong relationship between telephone penetration and income. Thus, the potential value of programs such as the lifeline programs aimed at low income households to increase telephone penetration has been demonstrated. However, since Table 1.3 clearly shows that the lowest penetration rates are for the younger households, the limitation of eligibility for lifeline programs in some states to the elderly seems misdirected. No evidence of the importance of installation charges, which are the focus of the Link-Up America Program, could be found in this study. Since such evidence has been found elsewhere, further study of this issue is in order.

TABLE 1.1

Telephone Penetration in the U.S.

Date	Households (millions)	Households with Telephones (millions)	Percentage with Telephones	Households without Telephones (millions)	Percentage without Telephones
November 1983	85.8	78.4	91.4%	7.4	8.6%
March 1984	86.0	78.9	91.8	7.1	8.2
July 1984	86.6	79.3	91.6	7.3	8.4
November 1984	87.4	79.9	91.4	7.5	8.6
March 1985	87.4	80.2	91.8	7.2	8.2
July 1985	88.2	81.0	91.8	7.2	8.2
November 1985	88.8	81.6	91.9	7.2	8.1
March 1986	89.0	82.1	92.2	6.9	7.8
July 1986	89.5	82.5	92.2	7.0	7.8
November 1986	89.9	83.1	92.4	6.8	7.6
March 1987	90.2	83.4	92.5	6.8	7.5
July 1987	90.7	83.7	92.3	7.0	7.7

TABLE 1.2

PERCENTAGE OF HOUSEHOLDS WITH A TELEPHONE BY NATIONAL TOTAL AND STATES

	1983 NOVEMBER		1984 MARCH		JULY		NOVEMBER		1984 ANNUAL AVERAGE		1985 MARCH	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
UNITED STATES	91.4	93.7	91.8	93.6	91.6	93.8	91.4	93.6	91.6	93.7	91.8	93.7
ALABAMA	87.9	90.2	88.9	90.4	90.3	91.8	86.1	89.3	88.4	90.5	88.4	90.3
ALASKA	83.8	86.8	85.8	88.7	87.6	90.0	86.1	88.4	86.5	89.0	89.4	91.7
ARIZONA	88.8	90.7	89.6	90.6	84.2	86.8	87.0	90.7	86.9	89.4	87.0	89.4
ARKANSAS	88.2	91.4	87.1	90.1	87.8	92.6	84.8	89.2	86.6	90.6	85.7	89.8
CALIFORNIA	91.7	93.5	92.8	93.8	92.2	93.8	92.4	93.8	92.5	93.8	93.0	94.1
COLORADO	94.4	96.5	94.7	96.4	91.9	94.4	93.2	95.2	93.2	95.4	96.2	97.7
CONNECTICUT	95.5	96.4	94.5	96.2	96.0	97.6	96.0	97.2	95.5	97.0	94.9	97.2
DELAWARE	95.0	96.6	95.4	96.3	93.7	95.1	93.7	95.8	94.3	95.7	96.6	97.4
DIST OF COL	94.7	95.6	96.1	97.5	93.5	95.4	95.1	96.0	94.9	96.3	91.6	93.5
FLORIDA	85.5	89.9	89.9	92.4	89.6	91.4	86.6	90.1	88.7	91.3	88.8	90.9
GEORGIA	88.9	92.1	85.8	88.2	86.8	90.5	86.0	88.7	86.2	89.1	89.0	91.1
HAWAII	94.6	96.4	93.6	94.2	95.1	96.3	91.9	94.3	93.5	94.9	93.3	95.1
IDAHO	89.5	92.2	90.4	91.8	91.0	91.8	90.8	91.4	90.7	91.7	91.7	93.3
ILLINOIS	95.0	95.9	95.7	96.8	93.6	95.0	93.2	95.5	94.2	95.8	94.4	95.6
INDIANA	90.3	93.5	91.8	93.2	91.2	93.3	91.7	94.4	91.6	93.6	91.7	94.8
IOWA	95.4	97.2	95.7	96.2	97.5	98.7	95.4	97.2	96.2	97.4	96.0	96.9
KANSAS	94.9	96.7	94.4	95.4	95.1	96.4	93.5	95.6	94.3	95.8	94.8	97.1
KENTUCKY	86.9	90.9	87.1	90.6	88.3	91.2	89.1	91.1	88.1	91.0	89.0	92.1
LOUISIANA	88.9	93.3	89.8	92.2	86.7	93.1	90.5	92.7	89.7	92.7	90.5	93.5
MAINE	90.7	93.1	94.4	95.7	92.1	94.9	93.9	95.2	93.4	95.3	94.2	95.3
MARYLAND	96.3	96.7	96.1	96.9	94.9	95.7	96.1	96.8	95.7	96.5	95.2	96.2
MASSACHUSETTS	94.3	95.9	95.7	96.5	96.5	97.4	95.4	96.9	95.9	96.9	95.6	96.7
MICHIGAN	93.8	94.9	93.1	95.0	93.0	94.5	92.4	94.0	92.8	94.5	92.6	94.1
MINNESOTA	96.4	97.5	95.8	97.4	96.6	97.2	95.0	96.6	95.8	97.1	97.1	96.2
MISSISSIPPI	82.4	89.1	81.8	86.1	83.1	89.8	82.2	86.6	82.4	87.5	81.6	87.0
MISSOURI	92.1	94.1	92.1	94.0	91.3	93.2	91.0	93.9	91.5	93.7	92.6	94.2
MONTANA	92.8	94.5	90.2	93.9	91.6	94.5	91.1	93.8	91.0	94.0	92.2	95.2
NEBRASKA	94.0	95.3	96.4	97.2	94.8	95.8	95.9	97.3	95.7	96.8	96.4	96.9
NEVADA	89.4	91.9	93.0	95.6	88.2	89.8	89.8	93.0	90.4	92.8	91.3	93.6
NEW HAMPSHIRE	95.0	96.9	94.7	96.3	95.9	96.4	92.4	94.7	94.3	95.8	93.4	94.4
NEW JERSEY	94.1	95.1	93.5	95.0	96.0	96.9	94.8	96.3	94.8	96.1	95.1	96.5
NEW MEXICO	85.3	90.9	81.0	85.8	81.2	86.3	84.0	88.8	82.0	87.0	85.0	88.0
NEW YORK	90.8	92.2	91.2	92.5	92.3	94.5	91.8	93.6	91.8	93.6	92.0	93.1
N. CAROLINA	89.3	92.9	88.5	92.2	87.9	91.4	88.5	92.2	88.3	91.9	89.8	92.2
N. DAKOTA	95.1	97.3	94.1	96.3	95.2	97.7	94.6	96.3	94.6	96.8	95.0	96.1
OHIO	92.2	93.9	93.2	94.9	93.4	95.1	90.8	93.3	92.4	94.4	91.7	94.7
OKLAHOMA	91.5	93.7	91.1	92.5	89.4	92.3	90.3	92.6	90.3	92.5	90.3	92.7
OREGON	91.2	93.5	91.1	92.6	92.2	93.5	88.5	90.9	90.6	92.3	89.2	91.0
PENNSYLVANIA	95.1	97.1	94.4	96.0	95.1	96.4	95.1	97.2	94.9	96.5	94.2	95.5
RHODE ISLAND	93.3	94.6	94.2	95.1	92.7	93.9	93.9	95.0	93.6	94.6	93.4	94.4
S. CAROLINA	81.8	84.9	84.5	87.9	83.6	88.1	82.9	87.1	83.7	87.7	87.2	90.6
S. DAKOTA	92.7	95.0	92.8	94.3	92.8	95.2	94.0	95.2	93.2	94.9	92.4	94.5
TENNESSEE	87.6	92.6	87.0	90.3	88.3	92.0	90.1	93.8	88.5	92.0	87.7	90.0
TEXAS	89.0	92.6	88.2	91.7	87.6	91.0	89.4	92.3	88.4	91.6	87.8	91.5
UTAH	90.3	92.2	92.2	94.1	93.2	94.6	92.2	93.9	92.5	94.2	95.3	95.7
VERMONT	92.7	94.3	91.2	93.4	93.1	94.6	92.5	94.0	92.3	94.0	90.6	91.8
VIRGINIA	93.1	94.7	93.2	95.1	93.0	95.6	92.9	94.6	93.1	95.1	92.8	94.5
WASHINGTON	92.5	93.7	92.7	94.3	93.6	95.2	92.7	93.6	93.0	94.4	92.7	94.4
W. VIRGINIA	88.1	91.1	87.2	93.5	86.5	90.0	89.4	92.1	87.7	91.8	86.1	91.4
WISCONSIN	94.8	96.1	95.9	96.3	93.5	96.0	96.3	97.4	95.2	96.6	93.8	95.7
WYOMING	89.7	93.3	89.2	92.3	86.4	91.2	92.1	95.0	89.9	92.8	91.7	94.2

TABLE 1.2 (Cont.)

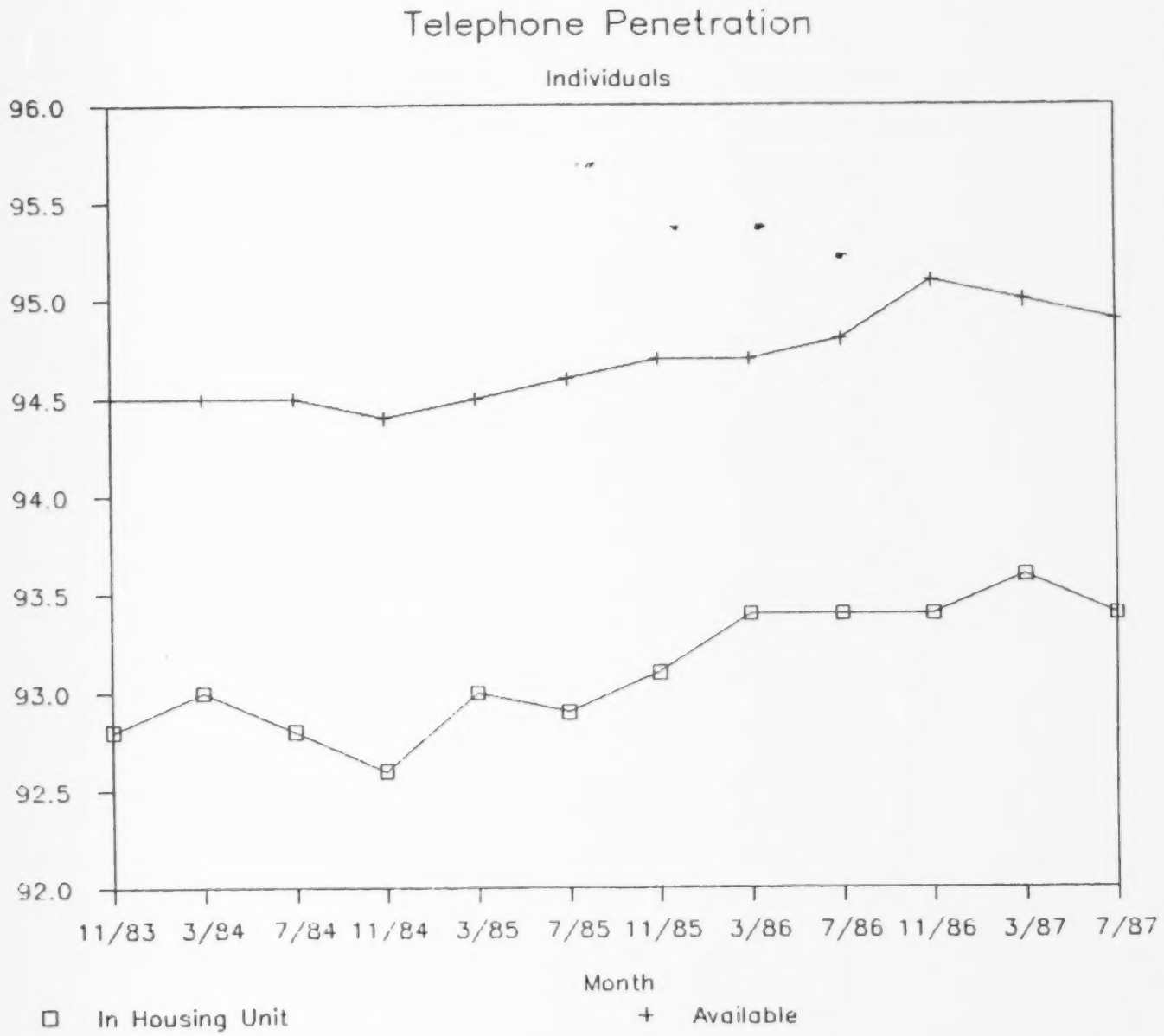
	1985 ANNUAL AVERAGE		1986 MARCH		JULY		NOVEMBER	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
UNITED STATES	91.8	93.9	92.2	93.9	92.2	94.0	92.4	94.4
ALABAMA	89.1	90.9	89.1	90.6	89.5	91.3	87.5	89.4
ALASKA	86.4	88.0	88.4	91.0	83.5	86.1	87.3	89.6
ARIZONA	88.0	89.8	90.8	91.8	89.8	91.4	87.6	89.4
ARKANSAS	85.9	89.9	85.8	89.4	85.1	89.8	88.3	92.1
CALIFORNIA	92.9	94.1	93.3	94.1	92.3	93.2	93.4	94.8
COLORADO	94.3	96.2	95.0	97.1	93.2	94.8	94.2	96.0
CONNECTICUT	96.2	97.6	97.3	97.7	96.8	96.3	97.0	97.8
DELAWARE	94.8	96.2	95.2	97.0	93.5	95.4	95.3	96.5
DIST OF COL	93.6	95.2	91.9	93.3	93.6	94.8	91.1	93.9
FLORIDA	89.6	91.7	89.1	91.3	89.9	92.4	91.1	93.8
GEORGIA	87.6	89.7	88.2	91.4	89.1	91.4	88.0	90.2
HAWAII	93.0	95.0	94.3	96.0	92.8	94.0	89.6	93.2
IDAHO	91.8	93.1	92.1	93.6	89.8	91.8	92.7	93.7
ILLINOIS	93.7	95.3	93.4	94.7	94.4	95.5	93.2	95.5
INDIANA	92.3	94.7	92.9	94.7	91.4	93.8	92.4	94.5
IOWA	95.1	96.4	95.5	96.6	96.0	96.9	95.6	96.1
KANSAS	94.4	96.4	93.9	95.4	94.5	96.0	95.4	96.9
KENTUCKY	87.4	91.1	87.3	90.3	85.3	90.0	86.1	91.6
LOUISIANA	90.3	93.6	90.5	93.0	89.7	93.2	85.9	89.6
MAINE	94.0	95.6	92.8	95.5	93.0	94.8	94.3	95.9
MARYLAND	95.5	96.7	95.7	96.6	95.6	96.8	95.9	96.7
MASSACHUSETTS	96.2	96.3	96.3	97.2	96.5	97.1	96.4	97.1
MICHIGAN	92.9	94.2	93.7	94.5	93.3	94.7	93.4	94.4
MINNESOTA	96.4	97.4	95.6	97.0	96.4	96.9	96.7	97.9
MISSISSIPPI	87.9	87.6	81.9	87.5	76.9	86.6	81.6	87.8
MISSOURI	92.5	94.8	93.0	93.8	94.1	95.8	93.1	95.0
MONTANA	91.4	93.9	93.0	95.1	89.1	92.6	90.6	93.5
NEBRASKA	95.3	96.6	96.0	97.2	95.0	96.1	95.8	97.1
NEVADA	91.8	93.8	91.0	92.7	92.9	93.6	93.1	94.8
NEW HAMPSHIRE	93.2	94.6	93.9	95.0	93.4	94.0	94.6	96.1
NEW JERSEY	94.9	96.2	94.2	95.6	96.0	96.9	94.4	96.0
NEW MEXICO	84.1	86.2	86.0	89.4	85.2	86.9	84.2	89.1
NEW YORK	92.1	93.6	92.9	93.9	93.7	94.7	93.0	94.3
N. CAROLINA	89.4	92.4	90.0	92.1	90.6	93.0	90.1	92.5
N. DAKOTA	95.3	96.7	95.0	95.5	95.6	97.2	97.9	98.2
OHIO	92.2	94.5	93.6	95.1	92.7	94.0	92.8	94.1
OKLAHOMA	88.8	91.7	89.7	92.7	91.1	93.0	90.5	93.4
OREGON	90.3	92.1	92.6	94.6	92.6	94.5	92.9	93.6
PENNSYLVANIA	95.3	96.6	95.9	97.4	96.3	97.1	96.7	97.7
RHODE ISLAND	94.0	95.1	95.0	95.8	97.1	97.7	95.5	96.8
S. CAROLINA	86.8	90.5	88.8	91.6	83.8	88.8	86.3	91.4
S. DAKOTA	92.6	94.5	93.4	94.2	91.5	93.3	92.9	95.1
TENNESSEE	89.3	92.6	89.7	92.9	88.5	93.3	90.8	94.8
TEXAS	88.1	91.6	87.7	90.7	89.4	92.1	89.5	92.8
UTAH	93.9	95.1	93.8	94.5	91.8	93.0	93.3	94.3
VERMONT	92.9	94.1	93.7	94.9	93.4	95.2	94.4	96.5
VIRGINIA	91.7	93.8	92.0	93.7	91.3	93.7	92.9	94.9
WASHINGTON	94.7	96.2	92.2	94.6	96.6	97.7	95.2	96.4
W. VIRGINIA	87.6	91.7	90.7	93.7	87.4	91.6	86.5	90.3
WISCONSIN	94.1	95.4	94.6	95.1	95.4	95.8	95.4	96.7
WYOMING	93.4	94.9	90.5	93.7	92.4	94.8	93.3	96.8

TABLE 1.2 (Cont.)

	1986 ANNUAL AVERAGE		1987 MARCH		JULY	
	Unit	Avail	Unit	Avail	Unit	Avail
UNITED STATES	92.3	94.1	92.5	94.3	92.3	94.2
ALABAMA	88.7	90.4	87.2	89.9	86.3	88.5
ALASKA	86.4	88.9	88.3	90.5	87.4	89.6
ARIZONA	89.4	90.9	89.1	91.8	88.6	90.4
ARKANSAS	86.4	90.4	87.0	90.4	85.8	90.4
CALIFORNIA	93.0	94.0	94.3	95.4	93.2	94.5
COLORADO	94.1	96.0	93.2	96.4	93.0	95.0
CONNECTICUT	97.0	97.9	97.9	97.9	96.7	98.2
DELAWARE	94.7	96.3	96.5	97.6	96.9	97.7
DIST OF COL	92.2	94.0	91.2	93.1	92.1	94.2
FLORIDA	90.0	92.5	91.2	93.1	92.3	94.5
GEORGIA	88.4	91.0	87.5	90.7	89.2	92.0
HAWAII	92.2	94.4	94.8	96.5	94.8	96.9
IDAHO	91.5	93.1	90.9	91.7	90.4	92.1
ILLINOIS	93.6	95.2	94.0	95.6	93.3	95.2
INDIANA	92.2	94.3	91.3	92.9	91.0	93.4
IOWA	95.7	96.5	95.5	96.7	94.9	96.4
KANSAS	94.6	96.1	95.5	96.6	95.2	96.4
KENTUCKY	88.2	90.6	87.4	90.9	85.0	89.9
LOUISIANA	88.7	91.9	88.9	90.6	89.5	91.6
MAINE	93.4	95.4	94.2	95.9	93.1	94.6
MARYLAND	95.7	96.7	96.2	96.5	94.2	96.1
MASSACHUSETTS	96.4	97.1	96.7	97.5	97.0	97.4
MICHIGAN	93.4	94.5	94.1	95.0	93.3	94.4
MINNESOTA	96.2	97.2	95.8	97.6	96.0	97.5
MISSISSIPPI	80.1	87.3	82.6	87.7	79.8	82.9
MISSOURI	93.4	94.9	91.5	94.3	93.5	95.6
MONTANA	90.9	93.7	91.4	94.2	89.3	92.1
NEBRASKA	95.6	96.8	95.0	96.4	95.1	95.7
NEVADA	92.4	93.7	92.1	92.6	92.5	94.3
NEW HAMPSHIRE	94.0	95.0	94.0	96.2	94.8	96.1
NEW JERSEY	94.9	96.1	94.3	95.5	95.6	96.6
NEW MEXICO	85.1	89.1	89.1	91.7	83.6	87.9
NEW YORK	93.2	94.3	93.3	94.2	92.5	94.1
N. CAROLINA	90.2	92.5	89.7	92.1	89.5	91.9
N. DAKOTA	96.1	97.0	97.8	98.2	96.1	96.8
OHIO	93.1	94.4	93.4	94.8	93.9	95.0
OKLAHOMA	90.4	93.0	88.5	91.9	89.1	92.5
OREGON	92.7	94.3	91.1	92.3	94.5	96.6
PENNSYLVANIA	96.3	97.4	96.0	97.0	97.0	97.8
RHODE ISLAND	95.9	96.8	95.1	96.6	95.0	95.8
S. CAROLINA	86.3	90.6	89.0	91.2	85.6	89.0
S. DAKOTA	92.6	94.2	92.2	95.1	93.3	94.9
TENNESSEE	89.6	93.6	89.3	92.3	89.1	91.6
TEXAS	88.9	91.9	90.4	92.4	89.5	92.3
UTAH	93.0	93.9	93.2	94.6	90.1	94.5
VERMONT	93.8	95.6	95.8	96.8	95.4	96.7
VIRGINIA	92.1	94.1	92.9	94.8	92.7	94.5
WASHINGTON	94.6	96.3	93.2	96.5	94.5	95.9
W. VIRGINIA	88.2	91.9	88.7	91.5	88.1	91.5
WISCONSIN	95.1	95.9	96.2	97.0	95.5	96.1
WYOMING	92.1	95.1	93.3	95.2	93.5	95.3

CHART 1.1

Percent with Telephone



16a

TABLE 1.3

PERCENTAGE OF HOUSEHOLDS WITH A TELEPHONE BY HOUSEHOLDER'S AGE

	ALL RACES		WHITE		BLACK		HISPANIC ORIGIN	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
NOVEMBER 83								
TOTAL HOUSEHOLDS	91.4	93.7	93.1	95.0	78.8	83.9	80.7	84.6
16-24 YRS OLD	76.6	84.1	80.2	86.2	49.9	68.2	64.9	71.9
25-54 YRS OLD	91.5	93.7	93.4	95.2	78.7	83.3	81.8	85.6
55-59 YRS OLD	95.0	96.1	96.1	97.0	86.3	88.5	89.3	89.3
60-64 YRS OLD	95.5	96.4	96.4	97.2	89.5	90.7	87.3	90.2
65-69 YRS OLD	95.5	96.2	96.5	97.0	87.2	89.0	90.7	90.7
70-99 YRS OLD	95.4	96.5	96.0	97.0	90.1	92.3	85.5	89.1
MARCH 84								
TOTAL HOUSEHOLDS	91.8	93.6	93.3	94.9	80.1	84.1	80.7	83.6
16-24 YRS OLD	77.8	84.0	80.3	85.5	57.9	71.5	59.0	66.2
25-54 YRS OLD	91.9	93.7	93.5	95.0	80.4	84.0	83.2	85.6
55-59 YRS OLD	94.9	95.9	95.7	96.6	87.6	89.9	88.7	90.5
60-64 YRS OLD	94.2	95.3	95.9	96.7	81.7	85.0	87.4	89.6
65-69 YRS OLD	96.1	96.6	97.0	97.4	87.8	89.3	85.8	87.8
70-99 YRS OLD	95.3	96.3	96.2	97.1	87.2	88.8	82.2	85.5
JULY 84								
TOTAL HOUSEHOLDS	91.6	93.8	93.2	95.0	80.5	85.3	81.1	84.6
16-24 YRS OLD	77.0	83.3	79.4	85.3	60.4	70.0	62.9	70.8
25-54 YRS OLD	91.7	93.8	93.4	95.1	79.8	84.9	83.1	85.8
55-59 YRS OLD	95.1	96.3	96.1	97.1	87.5	90.2	87.4	91.4
60-64 YRS OLD	95.0	96.2	95.8	96.9	87.7	89.5	88.1	90.5
65-69 YRS OLD	96.4	97.1	97.3	97.9	89.3	91.3	88.7	90.6
70-99 YRS OLD	95.2	96.5	95.9	96.9	89.6	93.1	84.0	88.5
NOVEMBER 84								
TOTAL HOUSEHOLDS	91.4	93.6	93.1	95.0	78.9	84.0	81.1	84.5
16-24 YRS OLD	76.1	83.4	79.0	85.4	56.3	70.8	60.8	70.8
25-54 YRS OLD	91.4	93.6	93.3	95.1	78.5	83.3	83.1	85.8
55-59 YRS OLD	94.9	96.2	96.3	97.5	84.7	87.4	85.3	88.3
60-64 YRS OLD	95.6	96.5	96.5	97.3	90.3	92.1	86.0	87.2
65-69 YRS OLD	96.0	96.7	97.1	97.6	86.7	89.1	96.2	96.2
70-99 YRS OLD	95.3	96.6	96.1	97.2	88.0	90.7	87.1	88.6
1984 ANNUAL AVERAGE								
TOTAL HOUSEHOLDS	91.6	93.7	93.2	94.9	79.8	84.5	80.9	84.3
16-24 YRS OLD	77.0	83.6	79.6	85.4	58.2	70.8	60.9	69.2
25-54 YRS OLD	91.7	93.7	93.4	95.1	79.6	84.1	83.1	85.7
55-59 YRS OLD	94.9	96.1	96.1	97.1	86.6	89.2	87.1	90.1
60-64 YRS OLD	94.9	96.0	96.0	97.0	86.6	88.8	87.1	89.1
65-69 YRS OLD	96.2	96.8	97.1	97.6	87.9	89.9	90.2	91.5
70-99 YRS OLD	95.3	96.5	96.0	97.1	88.2	90.9	84.4	87.6

TABLE 1.3 (Cont.)

MARCH 85								
TOTAL HOUSEHOLDS	91.8	93.7	93.3	95.0	80.1	84.4	81.2	84.1
16-24 YRS OLD	77.3	83.1	79.6	84.8	59.8	70.0	62.4	67.1
25-54 YRS OLD	91.9	93.8	93.6	95.2	79.5	83.9	83.0	85.5
55-59 YRS OLD	94.9	95.9	95.8	96.7	87.3	89.1	86.5	89.1
60-64 YRS OLD	94.3	95.4	95.5	96.2	84.4	87.6	91.3	93.2
65-69 YRS OLD	96.1	97.0	96.8	97.5	90.7	93.6	86.5	90.4
70-99 YRS OLD	95.6	96.5	96.5	97.3	87.4	89.4	87.4	91.7
JULY 85								
TOTAL HOUSEHOLDS	91.8	93.9	93.2	95.0	81.6	85.8	80.3	83.3
16-24 YRS OLD	78.3	84.4	80.7	86.3	59.6	70.2	67.8	73.7
25-54 YRS OLD	91.8	93.9	93.3	95.1	81.4	85.8	81.0	83.6
55-59 YRS OLD	94.7	95.9	95.9	96.8	86.3	89.4	87.2	88.0
60-64 YRS OLD	95.0	95.9	95.5	96.4	91.1	91.8	85.5	88.3
65-69 YRS OLD	95.5	96.5	96.7	97.4	86.1	88.5	85.9	89.7
70-99 YRS OLD	95.6	96.8	96.2	97.3	90.8	92.4	87.6	90.5
NOVEMBER 85								
TOTAL HOUSEHOLDS	91.9	94.0	93.3	95.2	81.5	85.3	82.5	85.7
16-24 YRS OLD	78.0	83.9	80.6	86.3	60.7	68.1	64.3	71.6
25-54 YRS OLD	91.9	94.0	93.5	95.3	81.1	85.2	83.4	86.5
55-59 YRS OLD	95.0	96.2	95.7	96.8	90.0	91.4	88.4	90.6
60-64 YRS OLD	95.5	96.3	96.3	97.0	89.8	91.3	92.3	92.3
65-69 YRS OLD	96.1	97.0	97.0	97.7	88.0	90.8	95.1	95.1
70-99 YRS OLD	95.3	96.6	96.0	97.2	88.9	90.5	87.8	90.4
1985 ANNUAL AVERAGE								
TOTAL HOUSEHOLDS	91.8	93.9	93.3	95.0	81.1	85.2	81.3	84.4
16-24 YRS OLD	77.9	83.8	80.3	85.8	60.0	69.4	64.8	70.8
25-54 YRS OLD	91.9	93.9	93.5	95.2	80.7	85.0	82.5	85.2
55-59 YRS OLD	94.9	96.0	95.8	96.8	87.8	90.0	87.4	89.2
60-64 YRS OLD	94.9	95.9	95.8	96.5	86.4	90.2	89.7	91.3
65-69 YRS OLD	95.9	96.8	96.8	97.5	88.2	90.9	89.1	91.7
70-99 YRS OLD	95.5	96.6	96.2	97.3	89.1	90.7	87.6	90.9
MARCH 86								
TOTAL HOUSEHOLDS	92.2	93.9	93.6	95.0	82.0	85.8	81.5	83.9
16-24 YRS OLD	78.1	82.9	80.6	84.7	58.2	69.0	60.1	63.8
25-54 YRS OLD	92.3	93.9	93.8	95.1	82.1	85.6	83.1	85.3
55-59 YRS OLD	95.2	96.3	96.1	97.0	87.8	90.6	86.8	90.3
60-64 YRS OLD	95.5	96.2	96.2	96.9	89.0	90.5	92.4	92.4
65-69 YRS OLD	95.7	96.7	96.6	97.4	87.2	89.8	94.1	95.1
70-99 YRS OLD	95.9	97.0	96.4	97.5	91.2	93.0	93.1	96.2
JULY 86								
TOTAL HOUSEHOLDS	92.2	94.0	93.7	95.2	81.5	85.7	81.1	83.6
16-24 YRS OLD	79.7	85.4	82.0	86.7	63.8	76.6	64.1	69.7
25-54 YRS OLD	92.1	93.9	93.8	95.3	80.4	84.4	83.0	85.1
55-59 YRS OLD	95.0	96.0	96.0	96.9	87.9	90.0	86.0	87.1
60-64 YRS OLD	95.3	96.2	95.9	96.6	90.9	92.9	81.8	85.1
65-69 YRS OLD	95.7	96.5	96.7	97.4	87.8	89.4	91.4	92.6
70-99 YRS OLD	95.8	96.5	96.4	97.1	90.6	91.8	85.3	88.1

TABLE 1.3 (Cont.)

NOVEMBER 86								
TOTAL HOUSEHOLDS	92.4	94.4	93.8	95.5	81.3	86.1	81.6	84.7
16-24 YRS OLD	79.4	84.7	81.9	86.3	57.5	71.1	65.9	68.8
25-54 YRS OLD	92.2	94.3	93.9	95.6	80.8	85.5	82.6	86.0
55-59 YRS OLD	95.3	96.6	96.1	97.0	88.3	93.2	90.1	93.8
60-64 YRS OLD	95.4	96.2	96.6	97.4	86.7	87.8	93.2	93.6
65-69 YRS OLD	96.0	96.9	96.7	97.5	90.2	92.5	85.7	88.0
70-99 YRS OLD	96.4	97.3	96.8	97.7	92.2	93.9	84.1	86.9
1986 ANNUAL AVERAGE								
TOTAL HOUSEHOLDS	92.3	94.1	93.7	95.2	81.6	85.9	81.4	84.1
16-24 YRS OLD	79.0	84.4	81.5	85.9	59.8	72.2	63.4	67.4
25-54 YRS OLD	92.2	94.0	93.8	95.3	81.1	85.2	82.9	85.5
55-59 YRS OLD	95.2	96.3	96.1	97.0	88.0	91.3	87.6	90.4
60-64 YRS OLD	95.4	96.2	96.2	97.0	88.9	90.4	89.1	90.3
65-69 YRS OLD	95.8	96.7	96.7	97.4	88.4	90.6	90.4	91.9
70-99 YRS OLD	96.0	97.0	96.5	97.4	91.3	92.9	87.5	89.8
MARCH 87								
TOTAL HOUSEHOLDS	92.5	94.3	93.9	95.4	82.2	85.7	84.1	86.5
16-24 YRS OLD	79.7	85.5	81.9	87.0	64.3	73.8	68.1	75.1
25-54 YRS OLD	92.6	94.2	94.1	95.5	81.7	85.3	85.1	87.0
55-59 YRS OLD	95.0	96.1	96.4	97.0	85.0	88.6	87.4	90.5
60-64 YRS OLD	95.6	96.4	96.5	97.2	87.6	89.8	92.6	92.6
65-69 YRS OLD	95.6	96.2	96.5	97.0	87.9	89.2	89.4	89.4
70-99 YRS OLD	95.8	97.0	96.7	97.5	91.4	92.3	95.3	96.1
JULY 87								
TOTAL HOUSEHOLDS	92.3	94.2	93.7	95.3	82.0	86.0	83.1	85.2
16-24 YRS OLD	78.2	83.3	81.2	85.7	57.6	67.2	66.2	69.7
25-54 YRS OLD	92.1	94.2	93.6	95.3	81.9	86.2	84.2	86.1
55-59 YRS OLD	95.4	96.2	96.5	97.2	87.1	89.8	90.8	92.4
60-64 YRS OLD	95.8	96.4	96.7	97.2	88.5	90.2	91.1	93.7
65-69 YRS OLD	96.5	97.2	97.5	98.1	88.9	90.2	87.5	87.5
70-99 YRS OLD	96.0	96.9	96.4	97.3	93.4	94.1	88.8	91.6

TABLE 1.4

PERCENTAGE OF HOUSEHOLDS WITH A TELEPHONE BY HOUSEHOLD SIZE

HOUSEHOLD SIZE	ALL RACES		WHITE		BLACK		HISPANIC ORIGIN	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
NOVEMBER 83								
TOTAL	91.4	93.7	93.1	95.0	78.8	83.9	80.7	84.6
1 PERSON	87.5	91.3	90.2	93.7	71.2	77.1	73.8	82.0
2 - 3	93.3	95.0	94.5	95.9	82.5	87.8	80.7	84.3
4 - 5	92.4	94.2	93.6	95.0	83.1	87.3	83.4	86.2
6 +	86.6	88.9	90.5	92.2	74.5	78.5	81.0	84.0
MARCH 84								
TOTAL	91.8	93.6	93.3	94.9	80.1	84.1	80.7	83.6
1 PERSON	88.6	91.7	90.7	93.3	73.9	79.9	72.2	76.4
2 - 3	93.3	94.9	94.5	95.8	82.4	86.2	80.7	84.2
4 - 5	92.7	94.0	94.1	95.2	82.9	85.7	85.4	87.2
6 +	86.4	88.3	88.6	90.2	78.8	82.0	78.8	81.5
JULY 84								
TOTAL	91.6	93.8	93.2	95.0	80.5	85.3	81.1	84.6
1 PERSON	88.6	92.1	90.2	93.4	77.3	83.2	71.9	80.5
2 - 3	93.1	94.9	94.4	95.8	82.2	87.2	82.5	85.1
4 - 5	92.3	93.9	93.8	95.1	81.9	86.1	83.9	86.3
6 +	87.6	89.3	91.0	92.3	76.1	79.0	79.5	83.1
NOVEMBER 84								
TOTAL	91.4	93.6	93.1	95.0	78.9	84.0	81.1	84.5
1 PERSON	87.8	91.5	90.1	93.5	73.5	78.9	74.6	81.1
2 - 3	93.1	95.0	94.4	96.0	82.3	87.1	82.7	86.2
4 - 5	92.3	93.9	93.9	95.1	80.6	85.3	82.6	85.1
6 +	86.8	88.8	89.8	91.0	74.0	79.3	79.1	80.8
1984 ANNUAL AVERAGE								
TOTAL	91.6	93.7	93.2	94.9	79.8	84.5	80.9	84.3
1 PERSON	88.3	91.8	90.3	93.4	74.9	80.7	72.9	79.4
2 - 3	93.2	94.9	94.5	95.9	82.3	86.8	82.0	85.2
4 - 5	92.5	94.0	93.9	95.1	81.8	85.7	83.9	86.2
6 +	86.9	88.8	89.8	91.1	76.3	80.1	79.2	81.8
MARCH 85								
TOTAL	91.8	93.7	93.3	95.0	80.1	84.4	81.2	84.1
1 PERSON	88.9	92.3	91.1	94.0	73.7	80.4	75.0	82.4
2 - 3	93.4	94.8	94.5	95.7	83.8	86.8	82.4	84.8
4 - 5	92.2	93.7	93.6	94.8	81.9	86.2	84.5	83.4
6 +	87.4	89.4	90.7	92.0	75.0	79.0	84.0	85.5
JULY 85								
TOTAL	91.8	93.9	93.2	95.0	81.6	85.8	80.3	83.3
1 PERSON	87.0	90.7	89.3	92.6	73.9	80.2	67.8	74.3
2 - 3	93.5	95.1	94.5	95.9	85.1	88.4	83.8	85.9
4 - 5	95.1	96.0	95.7	96.4	91.9	93.5	86.5	87.6
6 +	91.6	92.2	94.4	94.5	82.2	85.0	84.5	84.5

TABLE 1.4 (Cont.)

NOVEMBER 85								
TOTAL	91.9	94.0	93.3	95.2	81.5	85.3	82.5	85.7
1 PERSON	86.8	90.6	89.3	92.8	73.3	78.8	73.0	78.8
2 - 3	93.7	95.2	94.7	95.9	85.9	88.6	84.7	87.5
4 - 5	95.2	96.3	96.3	97.0	89.1	91.3	89.0	90.1
6 +	91.9	93.8	93.5	94.2	86.6	90.9	88.3	88.3
1985 ANNUAL AVERAGE								
TOTAL	91.8	93.9	93.3	95.0	81.1	85.2	81.3	84.4
1 PERSON	87.6	91.2	89.9	93.1	73.6	79.8	71.9	78.5
2 - 3	93.5	95.0	94.5	95.8	84.9	87.9	83.6	86.0
4 - 5	94.2	95.3	95.2	96.1	87.6	90.4	85.6	87.0
6 +	90.3	91.8	92.8	93.6	81.3	84.9	85.6	86.1
MARCH 86								
TOTAL	92.2	93.9	93.6	95.0	82.0	85.8	81.5	83.9
1 PERSON	89.1	92.3	90.6	93.5	79.2	83.9	79.1	85.0
2 - 3	93.9	95.2	95.0	96.0	84.5	88.0	81.2	83.3
4 - 5	92.7	93.8	94.1	94.9	82.8	86.4	83.8	85.5
6 +	86.7	88.0	89.7	90.7	74.2	76.9	78.8	79.8
JULY 86								
TOTAL	92.2	94.0	93.7	95.2	81.5	85.7	81.1	83.6
1 PERSON	87.6	90.8	90.1	92.9	74.3	79.5	71.8	76.6
2 - 3	94.0	95.3	94.9	96.0	85.4	89.1	83.4	85.5
4 - 5	95.1	95.8	96.0	96.4	89.6	91.2	86.8	87.5
6 +	92.5	94.2	95.4	95.5	78.0	87.4	88.2	88.2
NOVEMBER 86								
TOTAL	92.4	94.4	93.8	95.5	81.3	86.1	81.6	84.7
1 PERSON	87.7	91.2	90.4	93.3	72.6	79.5	70.9	76.5
2 - 3	94.1	95.5	95.0	96.2	86.0	89.7	84.7	87.4
4 - 5	95.5	96.3	96.3	96.8	91.3	93.5	85.9	87.1
6 +	91.1	92.3	93.5	94.1	81.2	84.1	82.8	84.3
1986 ANNUAL AVERAGE								
TOTAL	92.3	94.1	93.7	95.2	81.6	85.9	81.4	84.1
1 PERSON	88.1	91.4	90.4	93.2	75.4	81.0	73.9	79.3
2 - 3	94.0	95.3	95.0	96.1	85.3	88.9	83.1	85.4
4 - 5	94.4	95.3	95.4	96.1	87.9	90.4	85.5	86.7
6 +	90.1	91.5	92.9	93.5	77.8	82.8	83.3	84.1
MARCH 87								
TOTAL	92.5	94.3	93.9	95.4	82.2	85.7	84.1	86.5
1 PERSON	89.5	92.8	91.3	94.2	77.6	82.9	80.3	84.5
2 - 3	93.9	95.2	95.1	96.2	84.0	86.6	84.4	86.8
4 - 5	93.5	94.7	94.5	95.5	85.2	88.4	86.6	88.6
6 +	88.0	89.9	90.5	91.6	78.6	82.6	80.4	80.7

TABLE 1.4 (Cont.)

JULY 87								
TOTAL	92.1	94.2	93.7	95.3	82.0	86.0	83.1	85.2
1 PERSON	89.6	92.8	91.7	94.2	78.8	83.5	79.5	83.1
2 - 3	93.9	95.2	95.1	96.2	84.0	87.5	85.6	87.3
4 - 5	92.5	94.1	93.8	95.1	82.6	86.9	81.5	83.4
6 +	88.7	90.0	90.7	91.9	78.8	82.5	83.3	84.9

TABLE 1.5

PERCENTAGE OF FAMILIES WITH A TELEPHONE BY FAMILY INCOME

	ALL RACES		WHITE		BLACK		HISPANIC ORIGIN	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
NOVEMBER 83								
TOTAL	91.4	93.7	93.1	95.0	78.8	83.9	80.7	84.6
UNDER $5,000	71.7	78.4	75.7	81.9	62.7	70.4	58.3	64.6
$5,000 - $7,499	82.7	87.2	84.5	88.5	74.7	82.0	71.1	76.5
$7,500 - $9,999	88.2	90.9	89.6	92.2	80.5	83.9	72.6	77.9
$10,000 - $12,499	89.7	92.7	91.2	93.9	82.0	86.2	76.8	82.1
$12,500 - $14,999	92.1	94.6	93.4	95.2	82.5	90.7	89.8	91.7
$15,000 - $17,499	94.6	96.2	94.9	96.4	91.7	95.1	86.9	90.8
$17,500 - $19,999	95.7	97.4	96.1	97.7	91.4	95.0	88.4	91.5
$20,000 - $24,999	96.9	97.8	97.4	98.2	91.2	93.2	93.1	94.3
$25,000 - $29,999	98.0	98.9	98.2	99.0	96.1	97.2	98.3	99.0
$30,000 - $34,999	98.8	99.1	99.0	99.2	95.1	97.7	97.7	98.9
$35,000 - $39,999	99.0	99.5	99.1	99.5	98.4	98.4	92.1	98.2
$40,000 - $49,999	99.2	99.5	99.4	99.7	97.3	97.3	100.0	100.0
$50,000 - $74,999	99.4	99.7	99.5	99.7	98.5	100.0	99.6	100.0
$75,000 +	99.4	99.6	99.4	99.6	100.0	100.0	100.0	100.0
MARCH 84								
TOTAL	91.8	93.6	93.3	94.9	80.1	84.1	80.7	83.6
UNDER $5,000	71.4	77.0	74.7	79.8	62.8	69.7	53.6	60.2
$5,000 - $7,499	83.6	86.8	85.8	88.7	74.6	79.1	70.0	73.9
$7,500 - $9,999	85.8	89.3	87.7	90.8	75.9	81.1	72.2	76.3
$10,000 - $12,499	90.0	92.4	91.3	93.5	82.5	86.3	81.8	86.2
$12,500 - $14,999	92.7	94.3	93.6	95.2	84.6	86.7	88.5	89.7
$15,000 - $17,499	93.6	95.6	94.3	95.9	87.6	92.7	89.4	91.2
$17,500 - $19,999	95.3	96.3	95.4	96.3	94.8	96.4	87.1	88.0
$20,000 - $24,999	97.1	98.0	97.3	98.1	94.6	97.4	90.0	92.8
$25,000 - $29,999	98.1	98.6	98.5	98.9	93.5	94.8	96.2	97.6
$30,000 - $34,999	98.8	99.2	98.8	99.3	97.5	97.5	99.2	99.2
$35,000 - $39,999	99.4	99.6	99.5	99.7	96.3	97.2	100.0	100.0
$40,000 - $49,999	99.4	99.6	99.5	99.7	98.0	98.3	100.0	100.0
$50,000 - $74,999	99.2	99.6	99.3	99.7	97.0	97.0	100.0	100.0
$75,000 +	98.9	99.6	99.0	99.6	94.0	100.0	95.1	100.0
JULY 84								
TOTAL	91.6	93.8	93.2	95.0	80.5	85.3	81.1	84.6
UNDER $5,000	71.8	77.9	74.5	80.1	65.4	72.4	53.2	60.6
$5,000 - $7,499	82.6	86.9	84.8	88.8	74.4	80.3	71.7	76.1
$7,500 - $9,999	86.5	89.8	88.6	91.3	75.6	82.4	76.4	83.3
$10,000 - $12,499	89.7	92.7	90.7	93.3	83.4	88.9	80.7	84.1
$12,500 - $14,999	91.7	94.6	92.8	95.3	85.0	90.0	87.0	93.0
$15,000 - $17,499	94.1	95.9	94.5	96.3	89.4	91.1	87.6	88.0
$17,500 - $19,999	95.6	97.0	96.1	97.2	92.4	95.7	94.4	95.3
$20,000 - $24,999	96.8	97.8	97.2	98.0	92.9	95.7	96.7	97.3
$25,000 - $29,999	97.9	98.6	98.1	98.6	95.8	98.4	96.3	97.4
$30,000 - $34,999	98.8	99.1	98.8	99.2	97.7	97.7	100.0	100.0
$35,000 - $39,999	99.2	99.6	99.3	99.6	98.1	99.1	98.0	98.0
$40,000 - $49,999	99.3	99.5	99.5	99.7	96.1	96.1	100.0	100.0
$50,000 - $74,999	99.7	99.8	99.7	99.8	98.8	100.0	100.0	100.0
$75,000 +	99.1	99.6	99.1	99.6	100.0	100.0	100.0	100.0

TABLE 1.5 (Cont.)

NOVEMBER 84								
TOTAL	91.4	93.6	93.1	95.0	78.9	84.0	81.1	84.5
UNDER $5,000	70.3	77.5	74.4	81.3	61.4	69.4	58.5	66.1
$5,000 - $7,499	83.7	87.1	85.8	88.8	75.3	81.2	67.7	70.8
$7,500 - $9,999	87.0	89.8	88.7	90.9	80.2	84.7	76.3	79.5
$10,000 - $12,499	89.4	92.6	91.4	94.1	77.4	83.6	76.8	83.5
$12,500 - $14,999	92.0	94.2	92.5	94.5	86.6	91.6	86.5	88.4
$15,000 - $17,499	93.3	95.6	93.8	95.8	88.6	93.0	88.3	91.0
$17,500 - $19,999	94.3	95.9	95.2	96.5	88.0	91.0	91.5	95.2
$20,000 - $24,999	96.5	97.6	96.8	97.9	92.3	94.3	90.7	93.3
$25,000 - $29,999	98.4	99.1	98.6	99.2	96.0	98.3	96.7	96.7
$30,000 - $34,999	98.6	99.1	98.9	99.3	95.3	96.6	97.1	98.0
$35,000 - $39,999	99.1	99.4	99.1	99.4	98.7	98.7	96.5	97.6
$40,000 - $49,999	99.2	99.6	99.3	99.7	95.7	96.4	96.8	97.8
$50,000 - $74,999	99.5	99.9	99.6	99.9	98.3	98.3	100.0	100.0
$75,000 +	98.7	99.5	98.8	99.5	95.6	100.0	99.0	100.0
1984 ANNUAL AVERAGE								
TOTAL	91.6	93.7	93.2	94.9	79.8	84.5	80.9	84.3
UNDER $5,000	71.2	77.5	74.5	80.4	63.2	70.5	55.1	62.3
$5,000 - $7,499	83.3	86.9	85.5	88.7	74.8	80.2	69.8	73.6
$7,500 - $9,999	86.5	89.6	88.3	91.0	77.2	82.7	75.0	79.7
$10,000 - $12,499	89.7	92.6	91.1	93.6	81.1	86.3	79.7	84.6
$12,500 - $14,999	92.1	94.4	93.0	95.0	85.4	89.5	87.3	90.5
$15,000 - $17,499	93.7	95.7	94.2	96.0	88.5	92.2	88.4	90.0
$17,500 - $19,999	95.1	96.4	95.6	96.7	91.7	94.4	91.0	92.6
$20,000 - $24,999	96.8	97.8	97.1	98.0	93.3	95.8	92.5	94.5
$25,000 - $29,999	98.1	98.8	98.4	98.9	95.1	97.2	96.4	97.2
$30,000 - $34,999	98.7	99.1	98.8	99.3	96.8	97.2	98.8	99.1
$35,000 - $39,999	99.2	99.5	99.3	99.6	97.7	98.3	98.2	98.5
$40,000 - $49,999	99.3	99.6	99.4	99.7	96.6	96.9	98.9	99.3
$50,000 - $74,999	99.4	99.8	99.5	99.8	98.0	98.4	100.0	100.0
$75,000 +	98.9	99.6	98.9	99.6	96.5	100.0	98.0	100.0
MARCH 85								
TOTAL	91.8	93.7	93.3	95.0	80.1	84.4	81.2	84.1
UNDER $5,000	71.1	77.5	75.1	81.0	62.1	69.7	57.9	64.1
$5,000 - $7,499	82.5	86.1	85.0	88.1	72.0	77.6	65.9	70.6
$7,500 - $9,999	86.3	89.2	87.6	90.3	79.9	83.9	72.2	77.1
$10,000 - $12,499	89.5	92.2	90.7	93.1	81.5	86.0	85.1	88.6
$12,500 - $14,999	91.4	93.9	92.6	94.7	83.3	87.8	86.9	90.0
$15,000 - $17,499	93.7	95.8	94.6	96.3	88.1	92.0	85.8	88.5
$17,500 - $19,999	94.1	95.5	94.7	96.0	89.1	92.0	93.6	94.2
$20,000 - $24,999	96.2	97.2	96.4	97.3	93.3	95.5	88.8	91.0
$25,000 - $29,999	97.8	98.5	98.0	98.7	95.3	96.6	93.1	96.2
$30,000 - $34,999	98.6	99.0	98.8	99.0	97.3	98.3	97.8	97.8
$35,000 - $39,999	99.0	99.4	99.1	99.4	96.7	98.2	99.5	99.5
$40,000 - $49,999	98.9	99.2	99.0	99.3	97.0	98.0	97.4	97.4
$50,000 - $74,999	99.5	99.6	99.5	99.7	98.4	98.7	98.4	98.4
$75,000 +	99.5	99.6	99.5	99.6	100.0	100.0	100.0	100.0

TABLE 1.5 (Cont.)

JULY 85								
TOTAL	91.8	93.9	93.2	95.0	81.6	85.8	80.3	83.3
UNDER $5,000	72.0	77.9	74.9	80.7	64.5	71.1	60.7	65.8
$5,000 - $7,499	83.2	87.0	84.6	87.9	76.7	83.2	67.9	71.2
$7,500 - $9,999	86.9	90.8	87.7	91.1	82.3	88.1	76.0	78.1
$10,000 - $12,499	89.7	92.5	91.1	93.6	82.1	86.8	76.7	79.5
$12,500 - $14,999	91.0	93.6	92.6	94.9	80.2	84.6	79.2	83.2
$15,000 - $17,499	93.4	95.5	94.2	96.2	88.6	91.2	86.1	88.4
$17,500 - $19,999	94.5	96.1	94.8	96.5	91.9	93.0	87.1	89.8
$20,000 - $24,999	96.7	97.8	96.8	98.0	94.7	96.5	92.9	95.7
$25,000 - $29,999	97.1	98.1	97.4	98.2	94.4	97.0	91.5	95.2
$30,000 - $34,999	98.4	98.9	98.5	99.0	96.5	97.9	96.9	96.9
$35,000 - $39,999	98.7	99.2	98.8	99.4	98.4	98.4	95.8	98.6
$40,000 - $49,999	99.3	99.6	99.3	99.6	99.3	99.3	98.8	98.8
$50,000 - $74,999	99.3	99.7	99.4	99.7	97.7	98.8	100.0	100.0
$75,000 +	99.0	99.4	99.0	99.4	100.0	100.0	95.6	95.6
NOVEMBER 85								
TOTAL	91.9	94.0	93.3	95.2	81.5	85.3	82.5	85.7
UNDER $5,000	72.7	79.0	75.9	82.2	65.2	71.1	66.4	71.0
$5,000 - $7,499	82.5	86.3	84.7	88.2	73.3	78.6	65.9	71.9
$7,500 - $9,999	87.1	89.9	88.9	91.4	78.7	82.9	76.8	82.8
$10,000 - $12,499	89.6	92.0	90.5	93.1	83.3	85.2	79.3	82.4
$12,500 - $14,999	90.6	93.6	91.6	93.9	84.7	90.9	82.4	84.2
$15,000 - $17,499	93.1	95.5	93.8	96.1	88.0	92.1	85.3	89.0
$17,500 - $19,999	95.4	96.9	95.8	97.3	93.5	95.3	90.7	94.4
$20,000 - $24,999	96.0	97.4	96.1	97.5	95.1	96.8	92.3	94.4
$25,000 - $29,999	98.0	98.8	98.1	98.8	97.5	98.3	94.3	96.3
$30,000 - $34,999	98.7	99.1	98.8	99.2	98.2	98.9	97.3	97.3
$35,000 - $39,999	98.6	99.1	98.8	99.3	95.5	96.7	99.2	100.0
$40,000 - $49,999	99.0	99.3	99.1	99.4	97.0	97.3	96.3	98.3
$50,000 - $74,999	99.2	99.7	99.3	99.7	97.5	98.8	100.0	100.0
$75,000 +	99.2	99.3	99.3	99.4	92.7	92.7	100.0	100.0
1985 ANNUAL AVERAGE								
TOTAL	91.8	93.9	93.3	95.0	81.1	85.2	81.3	84.4
UNDER $5,000	71.9	78.1	75.3	81.3	63.9	70.6	61.6	67.0
$5,000 - $7,499	82.7	86.5	84.8	88.1	74.0	79.8	66.6	71.3
$7,500 - $9,999	86.8	90.0	88.1	90.9	80.3	85.0	75.0	79.4
$10,000 - $12,499	89.6	92.2	90.8	93.2	82.3	86.0	80.4	82.8
$12,500 - $14,999	91.0	93.7	92.2	94.5	82.7	87.8	82.8	85.8
$15,000 - $17,499	93.4	95.6	94.2	96.2	88.2	91.8	85.7	88.6
$17,500 - $19,999	94.7	96.2	95.1	96.6	91.5	93.4	90.4	92.8
$20,000 - $24,999	96.3	97.5	96.5	97.6	94.4	96.3	91.3	93.7
$25,000 - $29,999	97.6	98.5	97.8	98.6	95.8	97.3	93.0	95.4
$30,000 - $34,999	98.6	99.0	98.7	99.1	97.3	98.4	97.3	97.3
$35,000 - $39,999	98.8	99.2	98.9	99.4	96.9	97.8	98.2	99.4
$40,000 - $49,999	99.1	99.4	99.1	99.4	97.8	98.2	97.5	98.2
$50,000 - $74,999	99.3	99.7	99.4	99.7	97.9	98.8	99.5	99.5
$75,000 +	99.2	99.5	99.2	99.5	97.6	97.6	98.5	98.5

TABLE 1.5 (Cont.)

MARCH 86								
TOTAL	92.2	93.9	93.6	95.0	82.0	85.8	81.5	83.9
UNDER $5,000	71.1	76.9	74.0	79.3	63.8	71.1	56.7	61.3
$5,000 - $7,499	82.7	85.8	85.1	87.8	72.0	76.9	68.7	72.7
$7,500 - $9,999	87.6	90.0	88.8	90.8	82.1	86.4	72.1	73.4
$10,000 - $12,499	89.5	91.8	90.6	92.7	82.1	86.0	78.5	81.0
$12,500 - $14,999	91.3	94.1	92.0	94.7	87.6	90.9	84.6	90.0
$15,000 - $17,499	92.9	94.5	93.6	95.2	88.0	91.0	84.9	89.1
$17,500 - $19,999	94.6	96.0	95.2	96.4	90.1	92.8	86.1	88.8
$20,000 - $24,999	96.3	97.1	96.7	97.4	93.6	95.0	92.3	93.5
$25,000 - $29,999	97.2	98.0	97.7	98.3	91.6	94.0	92.5	92.5
$30,000 - $34,999	98.3	98.6	98.4	98.7	97.5	97.8	96.9	97.7
$35,000 - $39,999	98.9	99.2	99.1	99.3	98.1	98.1	100.0	100.0
$40,000 - $49,999	98.9	99.3	99.0	99.3	98.3	98.3	97.5	97.5
$50,000 - $74,999	99.5	99.7	99.5	99.7	99.3	99.3	100.0	100.0
$75,000 +	99.3	99.4	99.3	99.4	100.0	100.0	98.5	100.0
JULY 86								
TOTAL	92.2	94.0	93.7	95.2	81.5	85.7	81.1	83.6
UNDER $5,000	71.5	77.0	74.4	79.7	65.4	71.2	57.1	63.8
$5,000 - $7,499	82.6	86.1	85.0	87.9	73.8	79.2	64.9	68.6
$7,500 - $9,999	86.3	90.1	87.8	90.8	77.4	85.9	72.9	75.4
$10,000 - $12,499	89.6	92.4	90.8	93.2	82.9	87.3	80.9	81.9
$12,500 - $14,999	91.5	93.9	92.4	94.5	83.4	88.8	87.1	87.7
$15,000 - $17,499	93.1	95.2	94.3	95.8	84.2	90.6	86.9	88.9
$17,500 - $19,999	95.5	96.6	95.8	97.0	93.2	94.3	89.4	91.4
$20,000 - $24,999	96.6	97.6	97.0	98.0	92.1	94.0	94.5	95.0
$25,000 - $29,999	97.7	98.4	98.0	98.7	95.7	96.6	92.2	95.0
$30,000 - $34,999	98.3	98.8	98.5	99.0	96.6	97.8	98.0	98.7
$35,000 - $39,999	99.2	99.3	99.2	99.4	98.4	98.4	98.6	98.6
$40,000 - $49,999	99.1	99.4	99.1	99.4	99.0	99.0	98.1	98.9
$50,000 - $74,999	99.6	99.8	99.6	99.8	100.0	100.0	98.2	99.2
$75,000 +	99.6	99.8	99.7	99.8	95.5	100.0	100.0	100.0
NOVEMBER 86								
TOTAL	92.4	94.4	93.8	95.5	81.3	86.1	81.6	84.7
UNDER $5,000	72.3	78.3	76.3	81.3	62.6	70.9	58.9	63.7
$5,000 - $7,499	83.9	87.7	85.6	89.0	77.0	82.7	70.8	75.0
$7,500 - $9,999	86.8	90.4	88.7	91.6	76.3	83.2	73.8	77.7
$10,000 - $12,499	89.6	92.1	90.6	93.0	82.9	85.9	81.4	84.9
$12,500 - $14,999	90.8	93.6	91.3	94.0	88.1	91.3	80.0	85.7
$15,000 - $17,499	93.4	95.6	94.9	96.1	83.7	93.3	87.2	88.8
$17,500 - $19,999	94.6	96.4	94.9	96.6	93.4	95.6	86.0	89.7
$20,000 - $24,999	96.5	97.9	96.9	98.1	92.5	95.0	92.1	93.6
$25,000 - $29,999	98.2	98.9	98.4	99.0	96.2	97.1	97.0	98.1
$30,000 - $34,999	98.7	99.1	99.0	99.3	96.2	97.1	97.7	98.9
$35,000 - $39,999	98.6	99.3	98.8	99.4	96.5	97.2	95.8	99.2
$40,000 - $49,999	99.2	99.5	99.3	99.6	97.4	97.4	100.0	100.0
$50,000 - $74,999	99.5	99.7	99.6	99.8	99.0	99.0	100.0	100.0
$75,000 +	99.3	99.7	99.3	99.7	98.6	98.6	93.9	100.0

TABLE 1.5 (Cont.)

1986 ANNUAL AVERAGE								
TOTAL	92.3	94.1	93.7	95.2	81.6	85.9	81.4	84.1
UNDER $5,000	71.6	77.4	74.9	80.1	63.9	71.0	57.5	62.9
$5,000 - $7,499	83.1	86.5	85.2	88.2	74.3	79.6	68.1	72.1
$7,500 - $9,999	86.9	90.2	88.4	91.1	78.6	85.2	72.9	75.8
$10,000 - $12,499	89.6	92.1	90.7	93.0	82.6	86.4	80.3	82.6
$12,500 - $14,999	91.2	93.8	91.9	94.4	86.4	90.3	83.9	87.8
$15,000 - $17,499	93.1	95.1	94.3	95.7	85.3	91.6	86.3	88.9
$17,500 - $19,999	94.9	96.3	95.3	96.7	92.2	94.2	87.2	90.1
$20,000 - $24,999	96.5	97.5	96.9	97.9	92.8	94.6	93.0	94.1
$25,000 - $29,999	97.7	98.4	98.0	98.7	94.5	95.9	93.9	95.2
$30,000 - $34,999	98.4	98.9	98.6	99.0	96.7	97.5	97.5	98.4
$35,000 - $39,999	98.9	99.3	99.0	99.4	97.6	97.9	98.1	99.3
$40,000 - $49,999	99.1	99.4	99.1	99.4	98.2	98.2	98.5	98.8
$50,000 - $74,999	99.5	99.8	99.6	99.8	99.4	99.4	99.4	99.7
$75,000 +	99.4	99.6	99.4	99.6	98.0	99.5	97.5	100.0
MARCH 87								
TOTAL	92.5	94.3	93.9	95.4	82.2	85.7	84.1	86.5
UNDER $5,000	71.9	78.0	75.1	80.9	63.8	70.5	63.8	67.6
$5,000 - $7,499	83.6	86.7	85.3	87.9	76.8	81.9	69.5	73.0
$7,500 - $9,999	87.7	89.9	88.5	90.6	83.6	86.2	78.1	81.0
$10,000 - $12,499	89.4	92.0	90.5	93.1	81.4	85.2	78.9	82.1
$12,500 - $14,999	90.5	92.9	91.7	93.9	84.2	86.3	83.6	85.0
$15,000 - $17,499	92.4	94.7	93.3	95.6	85.8	88.6	83.7	88.9
$17,500 - $19,999	94.2	95.9	95.0	96.3	88.1	92.4	91.0	93.0
$20,000 - $24,999	96.6	97.4	97.1	97.9	93.5	94.6	94.1	95.1
$25,000 - $29,999	97.3	98.4	97.8	98.7	92.8	95.0	96.6	97.8
$30,000 - $34,999	98.1	98.7	98.3	98.9	96.0	96.4	96.5	97.5
$35,000 - $39,999	98.6	99.0	98.9	99.1	94.7	97.1	96.9	96.9
$40,000 - $49,999	99.4	99.7	99.4	99.7	99.6	99.6	99.6	99.9
$50,000 - $74,999	99.4	99.6	99.5	99.7	98.1	98.8	98.6	99.5
$75,000 +	99.7	99.8	99.7	99.8	97.2	100.0	100.0	100.0
JULY 87								
TOTAL	92.3	94.2	93.7	95.3	82.0	86.0	83.1	85.2
UNDER $5,000	70.7	75.9	74.1	78.7	63.8	70.5	58.0	62.7
$5,000 - $7,499	83.6	87.0	85.8	88.8	75.5	80.7	71.6	73.1
$7,500 - $9,999	86.5	89.6	88.1	90.8	78.8	83.7	76.6	79.0
$10,000 - $12,499	89.6	92.6	90.6	93.4	82.9	87.8	84.2	86.6
$12,500 - $14,999	91.2	93.7	92.3	94.4	83.6	88.8	86.3	88.4
$15,000 - $17,499	92.2	94.4	92.7	94.6	89.0	93.2	87.0	88.9
$17,500 - $19,999	94.8	96.2	95.8	97.0	88.1	91.0	87.7	87.7
$20,000 - $24,999	96.0	97.4	96.4	97.8	92.0	93.6	93.4	95.6
$25,000 - $29,999	97.6	98.4	98.1	98.8	93.7	95.2	98.7	98.7
$30,000 - $34,999	98.0	98.9	98.1	98.8	97.5	98.9	96.9	98.2
$35,000 - $39,999	98.8	99.2	98.8	99.2	97.8	98.9	96.8	96.8
$40,000 - $49,999	99.3	99.6	99.4	99.7	98.3	98.6	100.0	100.0
$50,000 - $74,999	99.4	99.8	99.4	99.9	99.4	99.4	97.6	99.1
$75,000 +	99.4	99.8	99.4	99.7	100.0	100.0	97.2	100.0

TABLE 1.6

PERCENTAGE OF PERSONS WITH A TELEPHONE BY LABOR FORCE STATUS

	TOTAL		WHITE		BLACK		HISPANIC ORIGIN	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
NOVEMBER 83								
TOTAL CNP	92.8	94.5	94.1	95.6	82.7	86.6	83.4	86.5
EMPLOYED	94.1	95.9	95.0	96.6	85.7	89.8	86.3	89.6
UNEMPLOYED	82.5	86.5	84.8	88.1	74.6	81.2	76.6	79.9
NOT IN LABOR FORCE	92.1	93.4	93.8	94.9	80.8	83.7	80.4	83.0
MARCH 84								
TOTAL CNP	93.0	94.5	94.2	95.5	83.5	86.7	83.3	85.7
EMPLOYED	94.5	95.9	95.3	96.5	87.6	90.8	87.1	89.3
UNEMPLOYED	82.0	85.7	83.8	87.1	75.5	80.3	73.3	76.1
NOT IN LABOR FORCE	92.0	93.3	93.8	94.9	80.2	82.7	79.6	82.1
JULY 84								
TOTAL CNP	92.8	94.5	94.1	95.5	83.1	87.1	82.7	85.7
EMPLOYED	93.9	95.6	94.9	96.3	85.6	89.6	84.8	87.8
UNEMPLOYED	81.2	84.8	83.7	86.6	73.9	79.7	74.0	78.2
NOT IN LABOR FORCE	92.4	93.8	93.9	95.1	82.1	85.7	80.8	83.5
NOVEMBER 84								
TOTAL CNP	92.6	94.4	94.1	95.5	82.0	86.2	82.9	85.5
EMPLOYED	93.8	95.6	94.8	96.4	84.7	89.1	85.1	87.8
UNEMPLOYED	81.8	85.6	84.3	87.3	74.7	80.8	74.7	77.8
NOT IN LABOR FORCE	92.0	93.4	93.8	95.0	79.8	83.2	80.6	82.9
1984 ANNUAL AVERAGE								
TOTAL CNP	92.8	94.5	94.1	95.5	82.9	86.7	83.0	85.6
EMPLOYED	94.0	95.7	95.0	96.4	85.9	89.8	85.7	88.3
UNEMPLOYED	81.7	85.3	84.0	87.0	74.7	80.2	74.0	77.4
NOT IN LABOR FORCE	92.1	93.5	93.8	95.0	80.7	83.9	80.3	82.8
MARCH 85								
TOTAL CNP	93.0	94.5	94.2	95.5	83.5	86.8	83.3	85.4
EMPLOYED	94.3	95.8	95.1	96.4	87.1	90.2	85.1	87.4
UNEMPLOYED	82.9	86.0	84.6	87.1	76.1	81.3	72.6	75.1
NOT IN LABOR FORCE	92.1	93.5	93.8	94.9	80.2	83.4	82.5	84.3
JULY 85								
TOTAL CNP	92.9	94.6	94.0	95.5	84.5	87.9	82.9	85.0
EMPLOYED	94.0	95.8	94.8	96.4	87.4	90.6	84.5	86.5
UNEMPLOYED	83.6	87.3	85.5	88.7	78.0	83.0	77.9	80.7
NOT IN LABOR FORCE	92.2	93.6	93.6	94.8	82.0	85.1	81.1	83.5

TABLE 1.6 (Cont.)

NOVEMBER 85								
TOTAL CNP	93.1	94.7	94.3	95.7	84.4	87.4	84.2	86.9
EMPLOYED	94.4	96.0	95.2	96.6	87.5	90.5	85.8	88.7
UNEMPLOYED	80.5	84.3	82.4	86.0	74.9	79.0	70.9	74.9
NOT IN LABOR FORCE	92.3	93.7	93.9	95.1	82.2	85.1	84.2	86.0
1985 ANNUAL AVERAGE								
TOTAL CNP	93.0	94.6	94.2	95.6	84.1	87.4	83.5	85.8
EMPLOYED	94.2	95.8	95.0	96.5	87.3	90.4	85.1	87.5
UNEMPLOYED	82.3	85.8	84.2	87.3	76.3	81.1	73.8	76.9
NOT IN LABOR FORCE	92.2	93.6	93.8	94.9	81.5	84.5	82.6	84.6
MARCH 86								
TOTAL CNP	93.4	94.7	94.5	95.6	84.9	87.8	83.4	85.1
EMPLOYED	94.6	95.8	95.4	96.4	88.3	91.0	85.1	86.9
UNEMPLOYED	82.7	86.1	85.1	88.0	74.6	80.2	73.6	75.3
NOT IN LABOR FORCE	92.7	93.8	94.2	95.1	82.4	85.0	82.5	84.1
JULY 86								
TOTAL CNP	93.4	94.8	94.6	95.7	84.4	87.9	83.2	85.1
EMPLOYED	94.8	96.1	95.6	96.8	87.3	90.9	85.4	87.3
UNEMPLOYED	82.2	85.9	84.1	87.4	75.7	80.8	79.0	80.1
NOT IN LABOR FORCE	92.3	93.6	93.8	94.8	82.3	85.2	79.9	82.2
NOVEMBER 86								
TOTAL CNP	93.4	95.1	94.6	95.9	84.5	88.5	83.4	86.1
EMPLOYED	94.6	96.2	95.4	96.7	87.7	91.4	85.4	87.9
UNEMPLOYED	81.9	86.0	84.2	87.6	74.1	81.0	73.3	79.2
NOT IN LABOR FORCE	92.8	94.2	94.3	95.4	82.3	85.9	81.7	84.0
1986 ANNUAL AVERAGE								
TOTAL CNP	93.4	94.8	94.6	95.8	84.6	88.1	83.3	85.4
EMPLOYED	94.7	96.1	95.5	96.6	87.7	91.1	85.3	87.4
UNEMPLOYED	82.3	86.0	84.5	87.6	74.8	80.7	75.3	78.2
NOT IN LABOR FORCE	92.6	93.9	94.1	95.1	82.3	85.4	81.4	83.4
MARCH 87								
TOTAL CNP	93.6	95.0	94.8	95.9	85.0	87.9	85.5	87.3
EMPLOYED	94.8	96.1	95.6	96.7	88.6	91.1	86.7	88.6
UNEMPLOYED	84.1	87.1	86.7	89.3	75.5	80.1	82.8	84.9
NOT IN LABOR FORCE	92.8	94.0	94.3	95.2	82.0	85.2	83.9	85.5

TABLE 1.6 (Cont.)

JULY 67								
TOTAL CNF	93.4	94.9	94.6	95.8	85.2	88.4	84.5	86.3
EMPLOYED	94.4	96.0	95.3	96.6	87.4	90.7	86.4	88.2
UNEMPLOYED	87.9	87.3	85.9	89.1	77.5	82.1	77.1	80.5
NOT IN LABOR FORCE	92.7	93.7	94.1	94.9	83.3	86.1	82.1	83.6

CHART 1.2

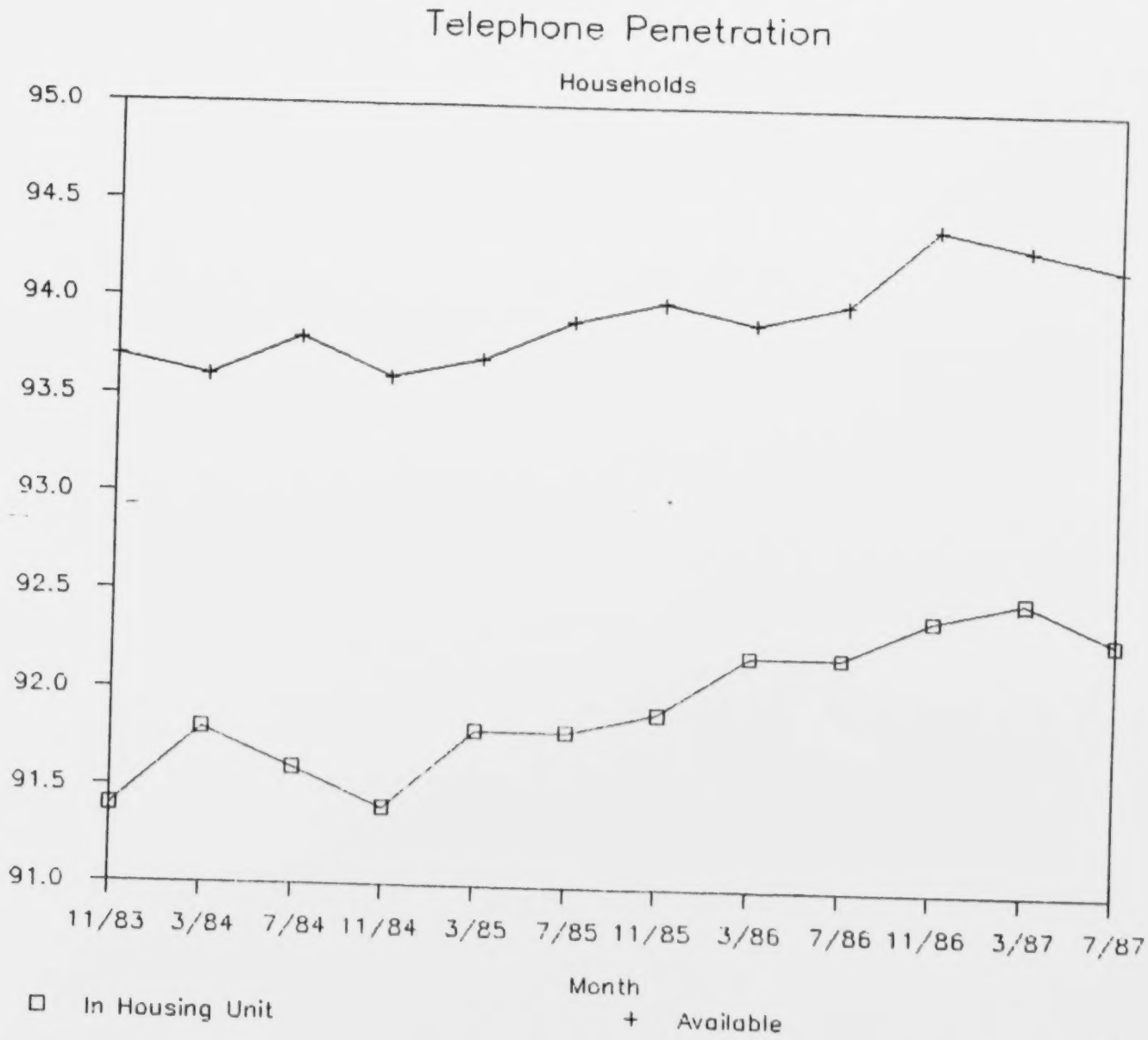

Telephone Penetration
Households
Percent with Telephone
95.0
94.5
94.0
93.5
93.0
92.5
92.0
91.5
91.0
11/83
3/84
7/84
11/84
3/85
7/85
11/85
3/86
7/86
11/86
3/87
7/87
Month
In Housing Unit
Available

TABLE 1.7

Critical Values for Determining Significant Differences for States

State	In Unit	Available
Total US	0.5%	0.5%
Alabama	3.6	3.4
Alaska	5.2	4.5
Arizona	4.5	4.3
Arkansas	5.8	4.8
California	1.5	1.4
Colorado	3.3	3.0
Connecticut	2.9	1.8
Delaware	3.1	2.7
Dist. of Columbia	3.8	2.8
Florida	2.8	2.7
Georgia	4.9	4.5
Hawaii	2.7	2.0
Idaho	4.1	3.4
Illinois	2.0	1.8
Indiana	3.3	2.7
Iowa	3.0	2.3
Kansas	2.5	2.3
Kentucky	5.2	4.8
Louisiana	4.3	3.8
Maine	3.8	3.3
Maryland	3.2	2.7
Massachusetts	2.5	2.3
Michigan	2.6	2.2
Minnesota	2.6	2.4
Mississippi	4.9	4.5
Missouri	3.6	2.9
Montana	5.2	4.3
Nebraska	3.3	3.0
Nevada	5.0	4.3
New Hampshire	4.0	3.3
New Jersey	2.4	2.1
New Mexico	5.8	4.5
New York	2.1	1.9
North Carolina	3.9	3.4
North Dakota	3.8	3.5
Ohio	2.2	1.9
Oklahoma	3.9	3.6

TABLE 1.7 (cont.)

State	In Unit	Available
Oregon	3.5	3.0
Pennsylvania	1.6	1.3
Rhode Island	3.0	2.5
South Carolina	6.1	5.3
South Dakota	3.6	3.5
Tennessee	4.8	4.3
Texas	2.6	2.3
Utah	4.6	4.5
Vermont	5.3	4.6
Virginia	4.0	3.4
Washington	4.0	3.9
West Virginia	4.5	3.9
Wisconsin	3.1	3.0
Wyoming	4.6	3.9

TABLE 1.8

Critical Values for Determining Significant Differences for Age and Race

	ALL RACES		WHITE		BLACK		HISPANIC	
	In Unit	Available	In Unit	Available	In Unit	Available	In Unit	Available
Total Households	0.5%	0.5%	0.5%	0.5%	2.2%	1.9%	4.8%	4.4%
16 - 24 Yrs old	1.6%	1.4%	1.6%	1.5%	5.4%	5.4%	10.3%	9.7%
25 - 54 Yrs old	0.7%	0.6%	0.7%	0.6%	2.7%	2.4%	5.9%	5.4%
55 - 59 Yrs old	2.1%	1.8%	2.1%	1.8%	8.9%	7.8%	20.7%	18.9%
60 - 64 Yrs old	2.1%	1.8%	2.1%	1.8%	9.5%	8.1%	24.5%	22.0%
65 - 69 Yrs old	2.3%	2.0%	2.3%	1.9%	10.3%	8.9%	30.6%	27.6%
70 - 99 Yrs old	1.6%	1.4%	1.6%	1.3%	7.8%	6.7%	22.5%	20.5%

TABLE 1.9

Critical Values for Determining Significant Differences for Household Size

	ALL RACES		WHITE		BLACK		HISPANIC	
	In Unit	Available	In Unit	Available	In Unit	Available	In Unit	Available
Total	0.5%	0.5%	0.5%	0.5%	2.2%	1.9%	4.8%	4.4%
1 Person	1.1%	0.9%	1.1%	1.0%	3.9%	3.6%	11.1%	10.5%
2 - 3	0.8%	0.7%	0.8%	0.7%	3.5%	3.0%	7.5%	6.8%
4 - 5	1.2%	1.0%	1.2%	1.0%	4.8%	4.2%	9.0%	8.1%
6 +	2.6%	2.2%	2.9%	2.5%	7.8%	7.0%	14.4%	12.8%

TABLE 1.10

Critical Values for Determining Significant Differences for Income

	ALL RACES		WHITE		BLACK		HISPANIC	
	In Unit	Available	In Unit	Available	In Unit	Available	In Unit	Available
Total	0.5%	0.5%	0.5%	0.5%	2.2%	1.9%	4.8%	4.4%
Under $5,000	1.3%	1.2%	1.5%	1.4%	3.4%	3.2%	8.6%	8.3%
$5,000 - $7,499	1.7%	1.5%	1.8%	1.6%	5.5%	4.9%	11.3%	10.6%
$7,500 - $9,999	2.0%	1.7%	2.0%	1.8%	7.2%	6.6%	14.0%	12.9%
$10,000 - $12,499	1.9%	1.6%	1.9%	1.7%	7.3%	6.4%	16.2%	14.8%
$12,500 - $14,999	2.1%	1.8%	2.1%	1.8%	8.8%	7.8%	18.4%	17.1%
$15,000 - $17,499	2.2%	1.9%	2.2%	2.0%	9.0%	8.2%	19.7%	18.0%
$17,500 - $19,999	2.3%	2.0%	2.3%	2.0%	10.8%	9.3%	20.0%	18.3%
$20,000 - $24,999	1.7%	1.5%	1.7%	1.5%	9.0%	7.7%	16.9%	15.1%
$25,000 - $29,999	1.9%	1.7%	1.9%	1.6%	10.9%	9.4%	21.8%	19.6%
$30,000 - $34,999	2.0%	1.8%	2.0%	1.7%	12.6%	10.7%	24.9%	22.2%
$35,000 - $39,999	2.4%	2.1%	2.4%	2.0%	15.6%	13.2%	28.9%	25.9%
$40,000 - $49,999	2.2%	1.9%	2.1%	1.8%	15.2%	12.8%	29.0%	25.7%
$50,000 - $74,999	2.3%	1.9%	2.2%	1.9%	16.4%	13.9%	32.3%	28.7%
$75,000 +	3.5%	3.0%	3.3%	2.8%	44.3%	38.0%	53.9%	49.0%

TABLE 1.11

Critical Values for Determining Significant Differences for Employment Status

	ALL RACES		WHITE		BLACK		HISPANIC	
	In Unit	Available	In Unit	Available	In Unit	Available	In Unit	Available
Total CNP	0.8%	0.7%	0.8%	0.7%	3.2%	2.8%	7.3%	6.6%
Employed	1.0%	0.9%	1.0%	0.9%	4.0%	3.5%	9.8%	8.9%
Unemployed	3.1%	2.8%	3.4%	3.0%	9.2%	8.4%	24.9%	22.9%
Not in Labor Force	1.3%	1.1%	1.3%	1.1%	5.1%	4.4%	11.9%	10.8%

TABLE 2.1
Areas in Sample

No.	State	Portion of State
1	Alabama	Birmingham (city)
2	Alabama	Birmingham suburbs
3	Alabama	Other SMSAs (central cities)
4	Alabama	Other SMSAs (suburbs)
5	Alabama	Non-SMSAs
6	Alaska	Entire state
7	Arizona	SMSAs (central cities)
8	Arizona	Rest of state
9	Arkansas	SMSAs
10	Arkansas	Non-SMSAs
11	California	Los Angeles/Long Beach (cities)
12	California	Los Angeles/Long Beach suburbs
13	California	San Francisco/Oakland (cities)
14	California	San Francisco/Oakland suburbs
15	California	Anaheim/Santa Ana/Garden Grove (cities)
16	California	Anaheim/Santa Ana/Garden Grove suburbs
17	California	San Diego (city)
18	California	San Diego suburbs
19	California	San Bernardino/Riverside/Ontario (cities)
20	California	San Bernandino/Riverside/Ontario suburbs
21	California	San Jose (city)
22	California	San Jose suburbs
23	California	Sacramento (city)
24	California	Sacramento suburbs
25	California	Other SMSAs (central cities)
26	California	Other SMSAs (suburbs)
27	California	Non-SMSAs
28	Colorda	Denver (city)
29	Colorado	Denver suburbs
30	Colorado	Other SMSAs
31	Colorado	Non-SMSAs
32	Connecticut	SMSAs (central cities)
33	Connecticut	SMSAs (suburbs)
34	Connecticut	Non-SMSAs
35	Delaware	Entire state

TABLE 2.1
Areas in Sample

No.	State	Portion of State
36	Dist. of Columbia	Washington (city)
37	Florida	Miami (city)
38	Florida	Miami suburbs
39	Florida	Tampa/St. Petersburg (cities)
40	Florida	Tampa/St. Petersburg suburbs
41	Florida	Other SMSAs (central cities)
42	Florida	Other SMSAs (suburbs)
43	Florida	Non-SMSAs
44	Georgia	Atlanta (city)
45	Georgia	Atlanta suburbs
46	Georgia	Other SMSAs (central cities)
47	Georgia	Other SMSAs (suburbs)
48	Georgia	Non-SMSAs
49	Hawaii	Honolulu (city)
50	Hawaii	Rest of state
51	Idaho	Entire state
52	Illinois	Chicago (city)
53	Illinois	Chicago suburbs
54	Illinois	St. Louis (Mo) suburbs
55	Illinois	Other SMSAs (central cities)
56	Illinois	Other SMSAs (suburbs)
57	Illinois	Non-SMSAs
58	Indiana	Indianapolis (city)
59	Indiana	Indianapolis suburbs
60	Indiana	Gary/Hammond/East Chicago (cities)
61	Indiana	Gary/Hammond/East Chicago suburbs
62	Indiana	Other SMSAs (central cities)
63	Indiana	Other SMSAs (suburbs)
64	Indiana	Non-SMSAs
65	Iowa	SMSAs (central cities)

TABLE 2.1
Areas in Sample

No.	State	Portion of State
66	Iowa	SMSAs (suburbs)
67	Iowa	Non-SMSAs
68	Kansas	Kansas City (Mo) suburbs
69	Kansas	Other SMSAs
70	Kansas	Non-SMSAs
71	Kentucky	Cincinnati (Oh) suburbs
72	Kentucky	Other SMSAs (central cities)
73	Kentucky	Other SMSAs (suburbs)
74	Kentucky	Non-SMSAs
75	Louisiana	New Orleans (city)
76	Louisiana	New Orleans suburbs
77	Louisiana	Other SMSAs (central cities)
78	Louisiana	Other SMSAs (suburbs)
79	Louisiana	Non-SMSAs
80	Maine	Entire state
81	Maryland	Baltimore (city)
82	Maryland	Baltimore suburbs
83	Maryland	Washington (DC) suburbs
84	Maryland	Non-SMSAs
85	Massachusetts	Boston (city)
86	Massachusetts	Boston suburbs
87	Massachusetts	Other SMSAs (central cities)
88	Massachusetts	Other SMSAs (suburbs)
89	Massachusetts	Non-SMSAs
90	Michigan	Detroit (city)
91	Michigan	Detroit suburbs
92	Michigan	Other SMSAs (central cities)
93	Michigan	Other SMSAs (suburbs)
94	Michigan	Non-SMSAs
95	Minnesota	Minneapolis/St. Paul (city)
96	Minnesota	Minneapolis/St. Paul suburbs

TABLE 2.1
Areas in Sample

No.	State	Portion of State
97	Minnesota	Other SMSAs
98	Minnesota	Non-SMSAs
99	Mississippi	SMSAs
100	Mississippi	Non-SMSAs
101	Missouri	St. Louis (city)
102	Missouri	St. Louis suburbs
103	Missouri	Kansas City (city)
104	Missouri	Kansas City suburbs
105	Missouri	Rest of state
106	Montana	Entire state
107	Nebraska	SMSAs (central cities)
108	Nebraska	Rest of state
109	Nevada	Entire state
110	New Hampshire	Entire state
111	New Jersey	Newark (city)
112	New Jersey	Newark suburbs
113	New Jersey	Paterson/Clifton/Passaic (cities)
114	New Jersey	Paterson/Clifton/Passaic suburbs
115	New Jersey	Philadelphia (Pa) suburbs
116	New Jersey	Other SMSAs (central cities)
117	New Jersey	Other SMSAs (suburbs)
118	New Jersey	Non-SMSAs
119	New Mexico	Albuquerque (SMSA)
120	New Mexico	Non-SMSAs
121	New York	New York (city)
122	New York	New York suburbs
123	New York	Nassau/Suffolk (SMSA)
124	New York	Buffalo (city)
125	New York	Buffalo suburbs
126	New York	Rochester (city)
127	New York	Rochester suburbs
128	New York	Albany/Schenectady/Troy (cities)
129	New York	Albany/Schenectady/Troy suburbs
130	New York	Other SMSAs (central cities)
131	New York	Other SMSAs (suburbs)

TABLE 2.1
Areas in Sample

No.	State	Portion of State
132	New York	Non-SMSAs
133	North Carolina	Greensboro/Winston-Salem/High Point (cities)
134	North Carolina	Greensboro/Winston-Salem/High Point suburbs
135	North Carolina	Other SMSAs (central cities)
136	North Carolina	Other SMSAs (suburbs)
137	North Carolina	Non-SMSAs
138	North Dakota	Entire state
139	Ohio	Cleveland (city)
140	Ohio	Cleveland suburbs
141	Ohio	Cincinnati (city)
142	Ohio	Cincinnati suburbs
143	Ohio	Columbus (city)
144	Ohio	Columbus suburbs
145	Ohio	Akron (city)
146	Ohio	Akron suburbs
147	Ohio	Other SMSAs (central cities)
148	Ohio	Other SMSAs (suburbs)
149	Ohio	Non-SMSAs
150	Oklahoma	SMSAs (central cities)
151	Oklahoma	SMSAs (suburbs)
152	Oklahoma	Non-SMSAs
153	Oregon	Portland (city)
154	Oregon	Portland suburbs
155	Oregon	Other SMSAs (suburbs)
156	Oregon	Rest of state
157	Pennsylvania	Philadelphia (city)
158	Pennsylvania	Philadelphia suburbs
159	Pennsylvania	Pittsburgh (city)
160	Pennsylvania	Pittsburgh suburbs
161	Pennsylvania	Other SMSAs (central cities)
162	Pennsylvania	Other SMSAs (suburbs)

TABLE 2.1
Areas in Sample

No.	State	Portion of State
163	Pennsylvania	Non-SMSAs
164	Rhode Island	Providence/Warwick/Pawtucket (cities)
165	Rhode Island	Rest of state
166	South Carolina	SMSAs
167	South Carolina	Non-SMSAs
168	South Dakota	Entire state
169	Tennessee	SMSAs (central cities)
170	Tennessee	SMSAs (suburbs)
171	Tennessee	Non-SMSAs
172	Texas	Houston (city)
173	Texas	Houston suburbs
174	Texas	Dallas (city)
175	Texas	Dallas suburbs
176	Texas	Fort Worth (city)
177	Texas	Fort Worth suburbs
178	Texas	Other SMSAs (central cities)
179	Texas	Other SMSAs (suburbs)
180	Texas	Non-SMSAs
181	Utah	SMSAs (central cities)
182	Utah	Rest of state
183	Vermont	Entire state
184	Virginia	Norfolk/Portsmouth (cities)
185	Virginia	Norfolk/Portsmouth suburbs
186	Virginia	Washington (DC) suburbs
187	Virginia	Other SMSAs (central cities)
188	Virginia	Other SMSAs (suburbs)
189	Virginia	Non-SMSAs
190	Washington	Seattle/Everett (cities)
191	Washington	Seattle/Everett suburbs
192	Washington	Other SMSAs (central cities)
193	Washington	Rest of state
194	West Virginia	SMSAs
195	West Virginia	Non-SMSAs
196	Wisconsin	Milwaukee (city)
197	Wisconsin	Milwaukee suburbs
198	Wisconsin	Other SMSAs (central cities)
199	Wisconsin	Other SMSAs (suburbs)
200	Wisconsin	Non-SMSAs
201	Wyoming	Entire state

The Illinois Lifeline Experience:

Using Value Of Service To Implement Universal Service

Prepared by
Perry J. Pockros

Presented at

The Fifteenth
Annual Telecommunications Policy
Research Conference

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Edward Zajec
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Perry J.Pockros
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

September 29, 1987 Airlie, Virginia

IR013175

Mr. Pockros is a Regulatory Policy Analyst with the State of Illinois Office of Public Counsel. The author gratefully acknowledges the data collection efforts of Illinois Bell Telephone Company, graphic assistance from Nancy Jenson and in-kind support from the Office of Public Counsel. The views opinions, and analyses expressed herein are solely those of the author.

Subsidies
Tu. 3:30

Perry J. Pockros: The Illinois Lifeline Experience: Using Value of Service to Implement Universal Service

Can the goal of universal service be maintained within a local usage sensitive rate structure? This paper tracks the development of a targeted lifeline subsidy to low-income households as part of a local measured service rate restructuring agreement in the City of Chicago and Northeastern Illinois. Economic and demographic survey findings are presented within a value of service framework. Various subsidy proposals are analyzed for their likely impact on subscription levels. If access to the network is considered a "public good," then the provision of a lifeline subsidy is a beneficial investment that results in positive social welfare gains.

013175

conflict with the means to obtain stated social goals. What is found in telecommunication markets in relation to energy utility markets, however, is a user valuation of service so great that welfare efficiencies are diminished by not providing demanders of telephone service access to the network. As more and more households gain network access, the marginal valuation of access increases to a level where social welfare can be maximized through welfare transfer mechanisms such as subsidies to facilitate the last incremental demander access to the system.

Only the unique characteristics of telecommunications' positive externalities and user marginal valuation reconcile cost-based rates with universal service. The number of possible customers that can be called is deemed to create a benefit. It is the opportunity to be able to call others, whether or not the option is exercised, that offers an aggregate societal benefit or value. In addition to this telephone-related externality, other societal benefits include emergency communications and community interaction. Continuing the commitment to universal service will enable the remainder of society to increase its benefit from the telephone network because of the externalities which all receive when all demanders of the network have access to the service.

II. Introduction

On June 25, 1986, the Illinois Commerce Commission (Ill. C.C.) approved a negotiated plan, in Docket 85-0364/86-0022, for restructuring Illinois Bell Telephone Company's (IBT) rates in Market Service Area 1 (MSA-1). MSA-1 includes the City of Chicago and much of northeastern Illinois. The rate restructuring plan implemented an unbundled local measured service tariff structure based on marginal cost-of-service rates that vary by time-of-day, duration, frequency, and distance. This new rate structure, in effect since March, 1987, is designed to be revenue neutral as well as responsive to the potential entry of providers of enhanced local service to business customers. The focus of this analysis, however, is on one component of the MSA-1 rate restructuring agreement that addresses the objective to protect universal access to the network - a targeted subsidy to low-income network subscribers and non-subscribers.

This paper presents the results of a joint company and intervenor research effort that asks a number of fundamental questions about telephone service among low-income families in Illinois. Illinois Bell Telephone Company's Business Research and Finance Department oversaw the administration of the research and provided final data analysis. The analyses and conclusions presented in this paper, however, reflect only the author's

analytical interpretation of the data. In no way should this analysis be construed as representing any research conclusions reached by Illinois Bell Telephone Company.

This presentation omits a number of findings concerned with the implementation, administration, and funding of a Lifeline subsidy. The focus is on the theoretical demand of low-income households for telephone service and whether providing subsidized service can be economically justified as in the public interest. Survey data is used to supplement the theoretical approach, and therefore, caution should be exercised in attaching a high level of statistical confidence to the highlighted findings.

III. Targeted Low-Income Research Objectives

The MSA-1 agreement includes a provision stating that Illinois Bell and consumer representatives will both study the extent to which low-income consumers currently purchase access and identify rate designs or subsidies that reduce pecuniary barriers to access. In specific, the Lifeline study has three major objectives: (1) identify a discrete body of low income households who desire, but are unable to purchase access at a level consistent with state average access penetration rates; (2) identify barriers and constraints which prevent the target population from acquiring access or maintaining access levels

consistent with universal service; and (3) develop and evaluate rate design or subsidy mechanisms to provide incentives to facilitate access to the network and assess the likely impacts of these methods in achieving the goal of increasing low-income subscription rates to the local network.

IV. Research Data

Five research modules utilized varying degrees of aggregated census data and disaggregated contingent survey data. Initial identification and analysis of the demographic profile of the proposed target population [1] were accomplished through sampling the 1980 Census of Population and Housing long questionnaire which accounts for about 19% of Illinois households' telephone availability. Demographic characteristics of income, ethnicity, and education were culled to distinguish subscribers from non-subscribers. These findings are not reported here.

Focus group interviews were conducted with both low-income subscribers and non-subscribers to illuminate qualitative data regarding constraints to maintaining access and the user acceptance of a potential subsidy program.

---

[1] The relevant target population are those households who are at 125% of and below the poverty level as determined by the federal government.

Surveys were completed with randomly selected groups of current general population subscribers, current low-income subscribers, and current low-income non-subscribers to provide primary observational data. These surveys updated the 1980 census sample and provided insight into consumer perception of the need, value, and willingness to pay for telecommunication service.

Telephone penetration demand scenarios were assessed using the 1983 National Economic Research Associates model, "Residential Demand for Telephone Service." Various combinations of installation and access subsidies were evaluated for their marginal efficacy in increasing low-income household penetration.

V. Framework For Analysis

One of the implicit hypotheses that emerged during the development of the research objectives was whether both subscribers and non-subscribers equally value access to the network. If different intra-customer classifications differentially value telephone access, then different intra-class penetrations rates might be expected. However, if current non-subscribers demonstrate the benefit or value foregone that current subscribers place on the opportunity to be able to call

others, then a societal Pareto outcome[2] could be achieved by facilitating access to non-subscribers to the network.

This analysis is, admittedly, dependent on whether telecommunication access is considered a "private" or "public" good. A private good analysis of the demand for a telephone access looks towards estimating the price elasticity of demand and then sets prices according to regulatory goals. Price elasticities are dependent on the demander valuation of substitutes, budget functions, and the commodity characteristics.

Public goods are different in that they are goods "which all enjoy in common in the sense that each individual's consumption of such a good leads to no substraction from any other individual's consumption of that good."[3] In general, public goods possess one or more of the following attributes : (1) each person "consumes" the same amount of the public good; (2) the marginal cost of serving one more customer is zero; and (3) the consumption by one individual does not reduce the amount available for other consumers.

---

[2] One allocation of goods in an economy is said to be Pareto preferred in comparison with another, if in the first arrangement all parties concerned are at least as well off and one or more of the parties is actually better off than in the second.

[3] Paul A. Samuelson, "The Pure Theory of Public Expenditure," Review of Economics and Statistics, Vol. 36, 1954, pp. 387-389.

Optimal provision of a public good requires a collective valuation of the good. In order to produce the "correct" amount of a public good, resources must be bid away from the production of private goods, and the required revenues to finance expenditures must be raised from consumers. It must be determined how much each individual would be willing to pay to have the good supplied at each level and then sum how much all would be willing to pay at any given level. If the marginal increase in the sum of demand as it moves from one level to a slightly higher level exceeds the marginal increase in the costs of supplying the public good at the higher level, then the good should be supplied at least to the higher level.

The residential demand for telecommunications service can be usefully examined as a derived demand based on a household's production and consumption choices.[4] The residential demand function for telecommunication service represents a household's interdependent utility with regard to the value of time (labor/leisure valuation) and endogenous preferences. Since there are no close substitues for telecommunications service, a household's demand schedule for telephone access can be considered a function of the value of the expenditure of time.

---

[4] Gary Becker has suggested that households "produce commodities by combining inputs of goods and time according to the cost-minimization rules of the traditional theory of the firm. Commodities are produced in quantities determined by maximizing a utility function of the commodity set subject to prices and a constraint on resources." A Theory of Time Allocation.

Viewed as a household demand function for a public good, the appropriate measurement of telephone access valuation requires the vertical summation of each household member's demand curve. Unlike a private good analysis where horizontally summing demand curves results in aggregate demand, the public good vertical summation of demand schedules implies a greater willingness to pay for the consumption (access) of that good at a given level because of different user valuations. For public goods, consumers are willing to purchase the same amount of the good but at different prices. While economic efficiency calls for a single price for private goods, different prices may be necessary for the efficient allocation of public goods among all classes of demanders who differentially value the provision of the good.

This theoretical approach to analyzing demand for telecommunications network access implies that welfare transfers to increase the provision of affordable access will, on the margin, provide positive gains in social welfare and resource allocation.

VI. Research Findings

Penetration

Telephone penetration at the national level has remained relatively stable between 1983 and 1987, with the most recent

data suggesting an upward trend.[5] As chart 1 indicates, however, telephone penetration rates appear to have fluctuated in the state of Illinois by 1.5 percent since 1983. The data are statistically inconclusive at a 95 percent confidence level, but nevertheless suggest a degree of diminution in telephone access. Segmenting household penetration levels by median household income provides the penetration dynamic at question. Plots 1-3 highlight the decreasing levels of penetration by decreasing median household income. Compared to the current general population penetration rate of 92.5%, Illinois low-income households current penetration levels are 81.7, a 10.8% differential.[6] In the state of Illinois, approximately 588,000 households would qualify as low-income under the 125% federal poverty guidelines. Of these, about 480,000 currently have telephone service while 108,000 do not. No data on the geographic distribution of this group was collected.

Perceived Value Of Service

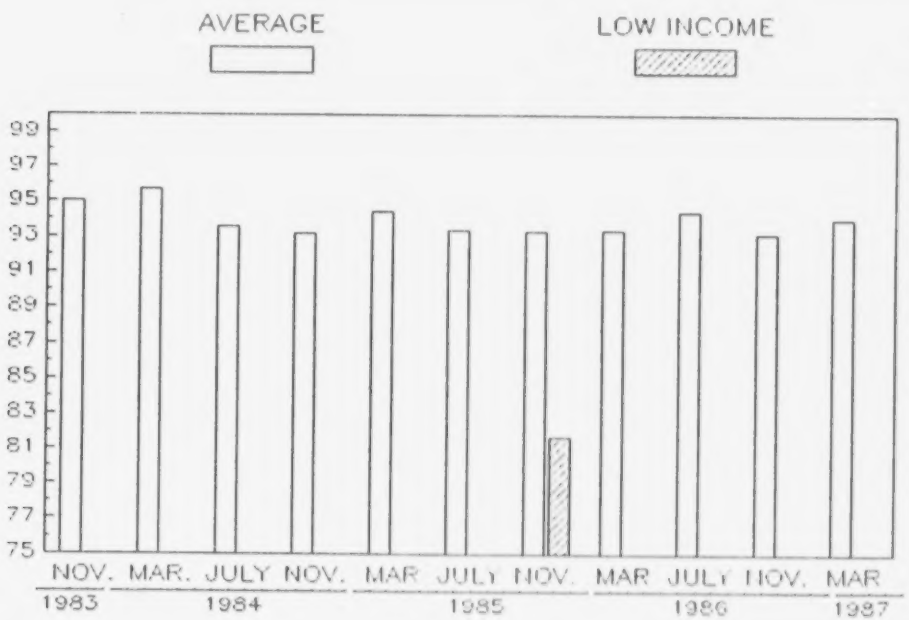
Incorporated within a household's budget function are expenditures for energy services, i.e., lighting and space conditioning. Each household's valuation of these services will determine the quantity and quality of these services demanded.

---

[5] Telephone penetration stood at 92.5 percent nationwide in March, 1987, up from 91.4 percent in November 1983 when the F.C.C. first collected this information.

[6] 1985 U.S. Census Bureau Current Population Survey.

Percentage of All Households in Illinois with a Telephone

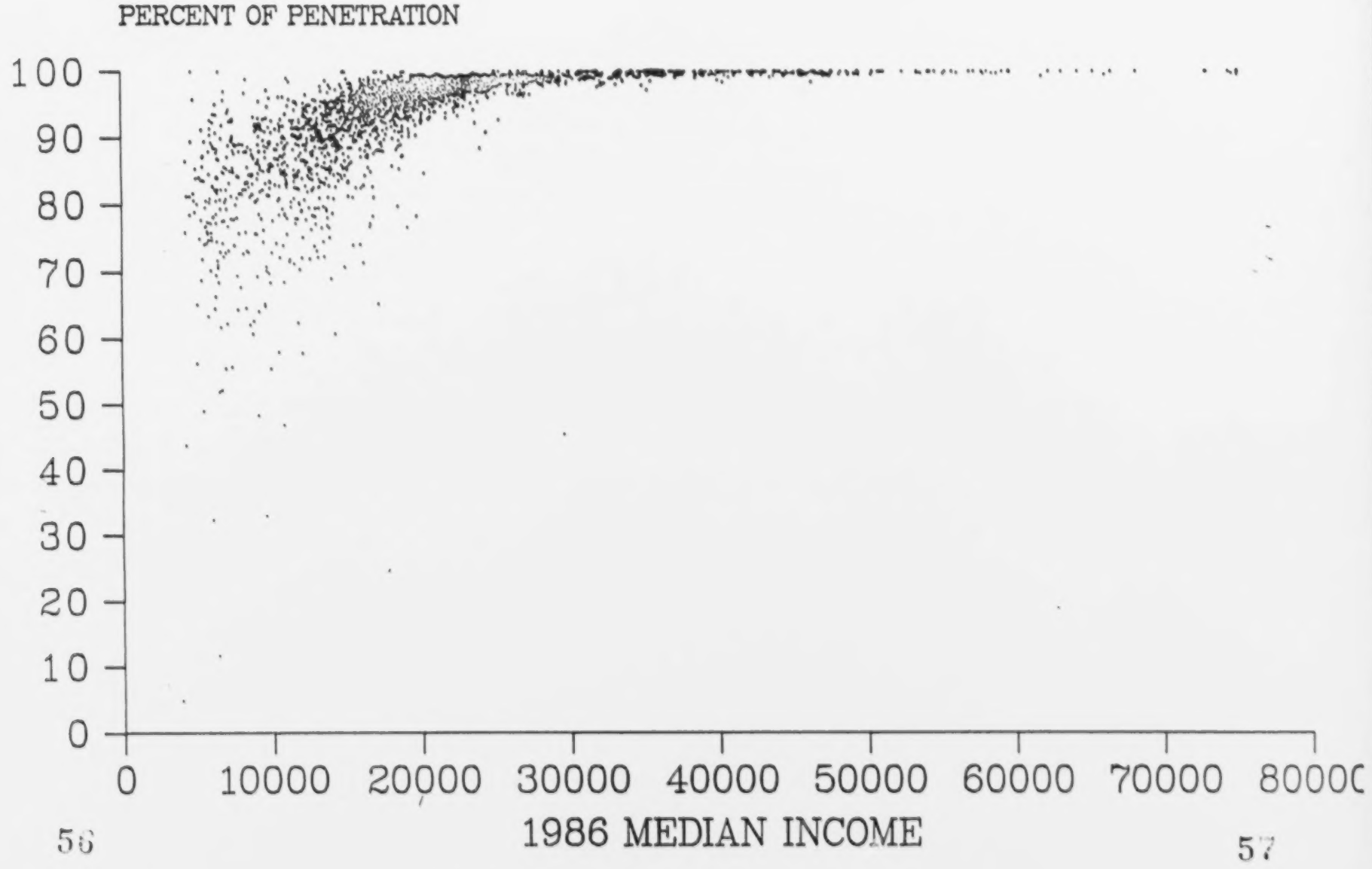


Notes: (1) Critical value = 2.0

(2) Source: U.S. Census Bureau

PERCENT OF TELEPHONE PENETRATION BY MEDIAN HOUSEHOLD INCOME PER CENSUS TRACT

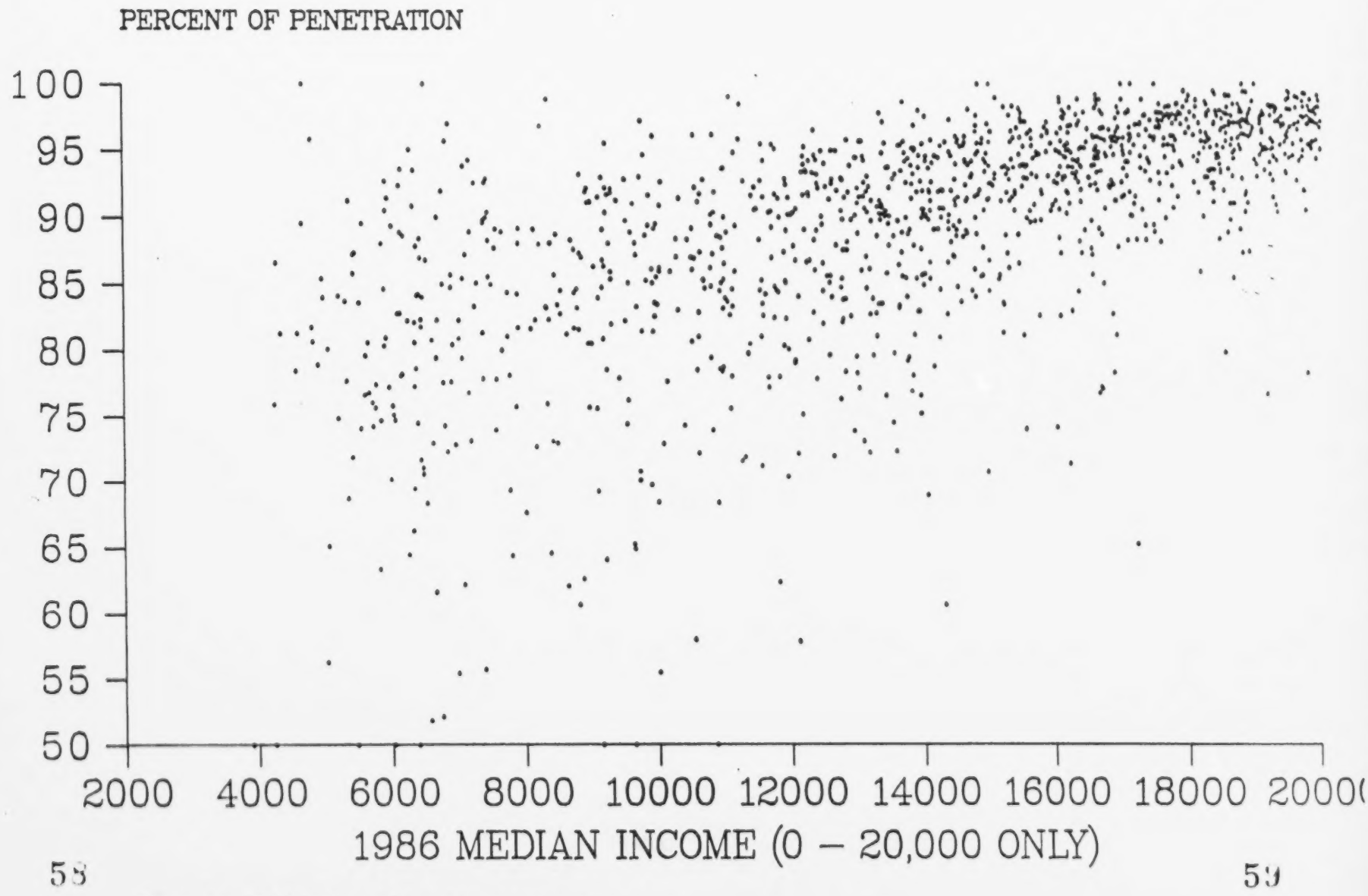
Plot 1



Source: Illinois Bell Telephone Co

PERCENT OF TELEPHONE PENETRATION BY MEDIAN HOUSEHOLD INCOME PER CENSUS TRACT

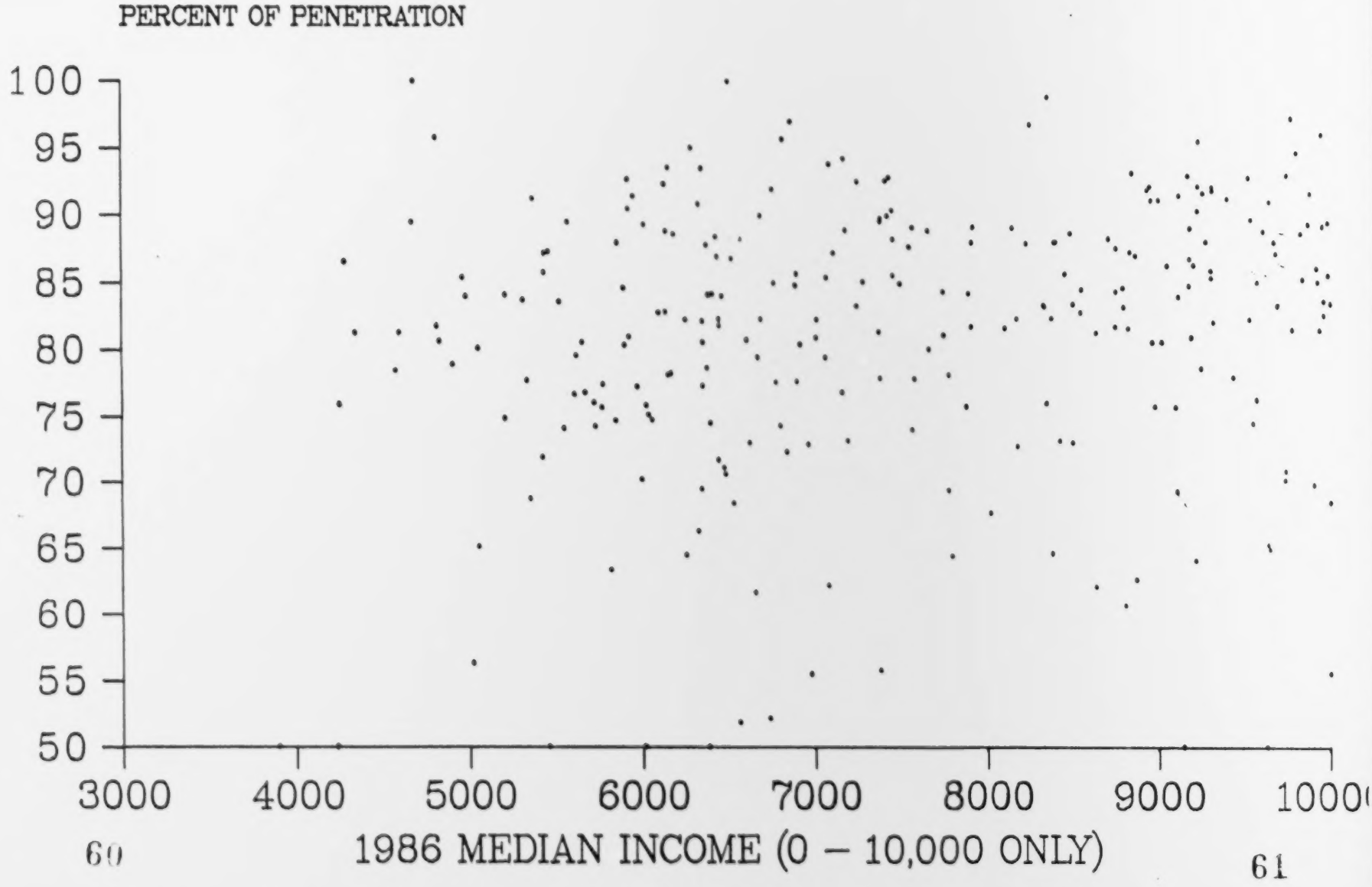
Plot 2



Source: Illinois Bell Telephone Co.

PERCENT OF TELEPHONE PENETRATION BY
MEDIAN HOUSEHOLD INCOME PER CENSUS TRACT

Plot 3



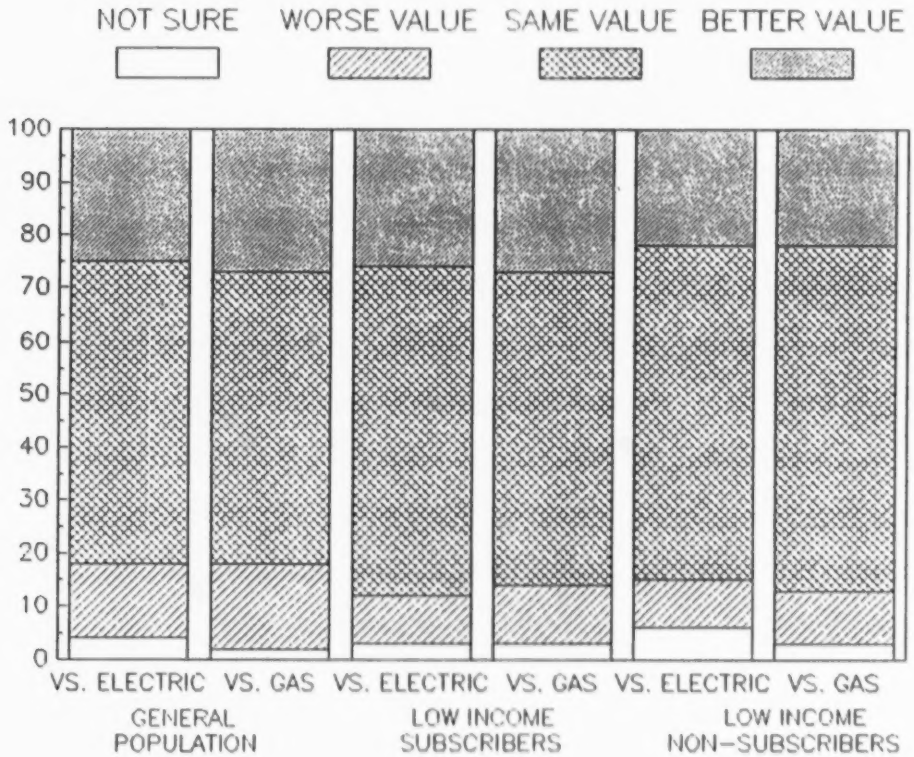
Source: Illinois Bell Telephone Co.

By using energy service comparable valuations as a proxy for energy expenditures faced by households, a relative measurement of the valuation of telecommunication services can be observed.

Chart 2 shows comparative responses of the general population, low-income subscribers, and low-income non-subscribers when asked to rate the value of telephone service in relation to electric and gas services. Fifteen percent of the general population consider telephone service a worse value than electric or gas service. Only 10% of low-income subscribers and non-subscribers thought that telephone service was a worse value. Twenty-two percent of low-income non-subscribers, 26.5% of low-income subscribers, and 26% of the general population rated telephone service a better value than delivered energy services. The remainder, 56% of the general population, 60.4% of low-income subscribers, and 64% of low-income non-subscribers, considered telephone service equivalent to the same value of energy services.

Value of service is a self-reported subjective household measurement. Yet, it is indicative of a household's relative valuation of access as it contributes to the household's production and consumption of goods and services. Clearly, compared to energy services, telecommunication services appear to offer greater consumer surplus which households can allocate between time-intensive or goods-intensive activities.

VALUE OF TELEPHONE SERVICE



It is interesting to note that the percentage of both low-income subscribers and non-subscribers who consider telephone service a better or equal value is greater than (by 4-6%) the general population. These households with constrained budgets place a valuation on telephone service not proportional to their market purchasing power. Several implications may be drawn: low-income households derive greater consumer surplus from telephone service than energy services; affordability does not diminish the perceived value of telephone use or access; not supplying low-income non-subscribers who value telephone service the same as or greater than the general population results in social deadweight losses from potential transactions not consummated.

Perceived Cost of Service

If current low-income subscribers and non-subscribers attach a high valuation to telephone access, it would follow that they would be willing to pay a price of access equal to their marginal valuation. Willingness to pay is a function of, among others, the perceived market price of the desired service. Consumers of goods do tend to misrepresent preferences about what they would pay for a good if there is an free opportunity to consume that good. However, relative consistency in the perception of the price of local telephone service among the general population and low-income subscribers and non-subscribers supports the proposition that income, and not tastes, is the

strongest determinant of the level of universal telephone service. If all households equally value access and know the costs of service, then one set of households' reduced access levels indicates a lack of resources with which to purchase the service. A divergence in consistency of the perception of the cost of service suggests imperfect information by which to assess accurately the added costs of telephone access in relation to the potential production of household benefits.

The general population, low-income subscribers and non-subscribers were asked to estimate the average costs of various components of telephone service. They were asked to estimate the cost of purchasing a telephone set, the monthly cost of renting a telephone set, the average installation cost, the average deposit required, long distance bills, and monthly local service bills. In general, these cost components represent both the fixed and variable costs of residential telephone service. While fixed costs may not be relevant to current subscribers,[7] they are very significant hurdles to non-subscribers to purchasing service.

Three major fixed cost components are upfront installation charges, security deposits, and phone set costs. When asked how much it would cost to have a phone installed, the median estimate of low-income non-subscribers was $60. Estimates ranged from $0

---

[7] Within the MSA-1 service territory, it is estimated that 19% of existing customers move in any given year and would then face the fixed costs of purchasing access.

to $250. When asked a similar question, the median estimate of both low-income subscribers and the general population was $50. Estimates ranged from $10 to $550.

When asked how much do you think you would have to pay as a deposit for telephone service, the median estimate of low-income non-subscribers was $45. Estimates ranged from a low of $4 to a high of $150. When asked a similar question, the median estimate of the general population was $50.00. Estimates ranged from $1 to $200.

Five in eight low-income non-subscribers did not own a telephone set. When asked what arrangements they would make for a telephone set if network access were made available to them, 57% of low-income non-subscribers without telephone sets would rent a phone while 35% would purchase one. When asked the cost to buy a telephone set, the median estimate of low income non-subscribers currently without telephone sets was $30.00. When asked the same question, the median estimate of low-income subscribers was $30.00 and the median estimate of the general population was $35.00.

The two major variable cost components of residential telephone service are monthly local service and monthly long distance usage. When asked to estimate their monthly average bill for local service, the median estimate of low-income non-subscribers was $30. When asked the same question, the median

estimate of low-income subscribers was $20 and the median estimate at the general population was $19. When asked to estimate their monthly bill for local and long distance usage, the median estimate of low-income non-subscribers was $50. In response to the same inquiry, the median estimate of low-income subscribers was $30 and the median estimate of the general population was $35.

The three survey populations have relatively consistent perceptions of the upfront fixed costs of telephone access. It appears that these groups have information on the upfront cost estimates to compute at least one-half of the household cost/benefit analyses regarding the purchase of network access. It is the variable usage component of telecommunication services where a dichotomy of perception appears. In comparison to the general population's average monthly local service bills, low-income non-suscribers may overestimate their own bills or calling patterns. Perhaps these respondent's calling patterns are influenced by what they perceive to be the amount of time spent at their home. Additionally, not having current experience with the costs of local usage may cause non-suscribers to inflate perceived costs and to undervalue potential benefits. Past experience with combination long-distance and local service billing may also be a source of confusion, which has a cost.

Affordability of Service

In an attempt to capture the relationship between the perceived cost of service and ability to afford service, low-income non-subscribers were asked what they thought they could pay for both local and long distance service each month. The median estimate of their response was $45. The difference between what the respondents said they could pay and what they estimated their local and long distance bill would be was computed. 31.5% indicated that they could afford a range of $1 to $50 more per month, 21.6% could afford no more, and 46.9% needed some help in the range of $1 to $100 more per month. Over three-quarters of the low-income non-subscribers indicated that they could afford to pay more monthly than they estimated their local service bill to be while 20% responded that they needed additional assistance of $1 to $30 per month.

This computation elucidates some misrepresentation of preferences and subsequently, willingess to pay. It appears that the majority of respondents could afford at least monthly service and half could afford monthly local and long distance. Once the upfront fixed costs are met, most of these households may be able to incorporate telephone expenditures in their household budget function. Of course, whether a household does in fact have extra purchasing power is a function of other market prices and the household's basket of consuming activities. Thus, it appears that respondents may claim they could "afford" more, in

actuality, it may represent a trade-off of other household production inputs.

Perceived Preference for Subsidy Design

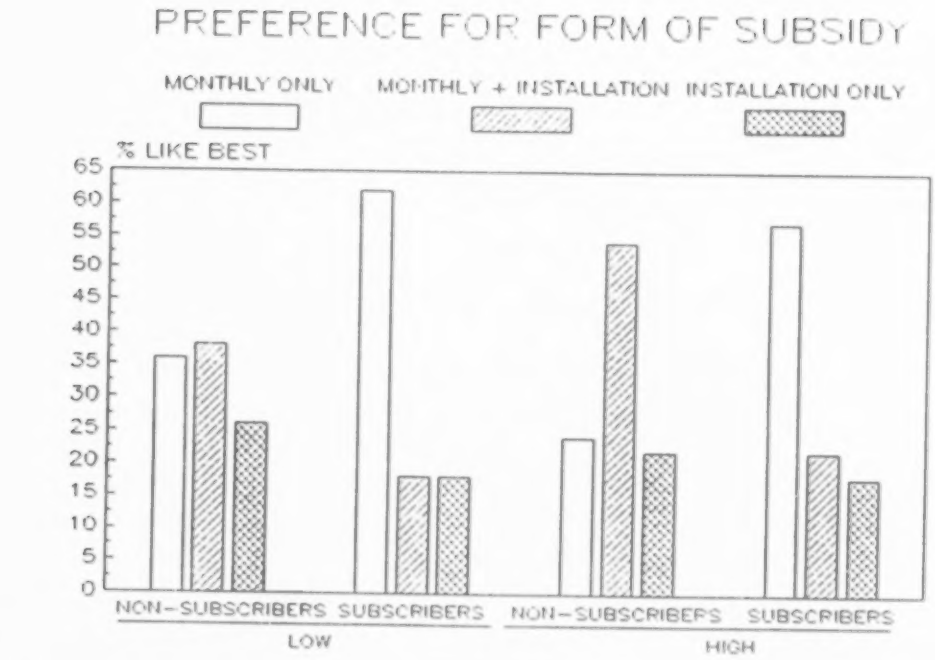
Low-income subscribers and low-income non-subscribers were asked to rank the following high and low discount rate structure according to their preference:

1) a discount only on monthly service
2) a discount on both installation and monthly service
3) a discount only on installation.

Chart 3 displays the respondents preferences for the form of subsidy. Almost 50% of the low income non-subscribers said that they preferred a discount on both the installation and monthly service. In contrast, almost 60% of low income subscribers indicate that they preferred a monthly discount. Both groups responded that a discount only on installation was least favorable.

Demand Analysis

To determine the responsiveness to price of low-income household demand for telephone service, various combinations of subsidy proposals were analyzed for their likely impact on



	HIGH	LOW
MONTHLY ONLY:	$6/MO	$4/MO
MONTHLY + INSTALLATION:	$40 + $4/MO	$20 + $2/MO
INSTALLATION ONLY:	$70	$50

subscription levels. Changes in access prices and installation charges were evaluated to assess the sensitivity of survey respondents preferences for a subsidy design to the model's predicted outcome. Access price and installation price coefficients were estimated to drive the demand analysis.

The National Economic Research Associates (NERA) "Residential Demand for Telephone Service model" was used to predict penetration levels for 18 subsidy alternatives. The NERA model estimates the log linear likelihood that households will purchase telephone service based on prices and demographic characteristics. The model specification is the logistic form of regression analysis reflecting the binary choice of purchasing or not purchasing telephone service. This model specification is very convenient because it insures that no matter what values are taken by the explanatory variables, the implied or predicted value of the relative frequency must be positive and less than one.[8]

1985 U.S. Census Bureau Current Population Survey data for Illinois was utilized to derive the following model specific independent coefficients:

---

[8] This specification uses ln(p/(1-p)) as the dependent variable of the regression and it determines the effect of the k explanatory variables on this variable, as summarized by the estimated coefficients $\hat{\theta}$.

CPI Adjustment	1.3420
1985 Customer Premise Penetration	0.8167
1984 Measured Rate Availability	0.9800
Access Price Coefficient	-0.0631
Installation Price Coefficient	-0.0168

Using the 1985 low income household telephone penetration rate of 81.7% and the numeric results from the NERA model runs, chart 4 was developed. This graph indicates iso-penetration curves for new low-income subscribers. For example, a subsidy package of a $2 monthly discount and a $55 installation discount increases low-income telephone penetration to a predicted 90% level, an increase of 8.3% over the present level of subscription.

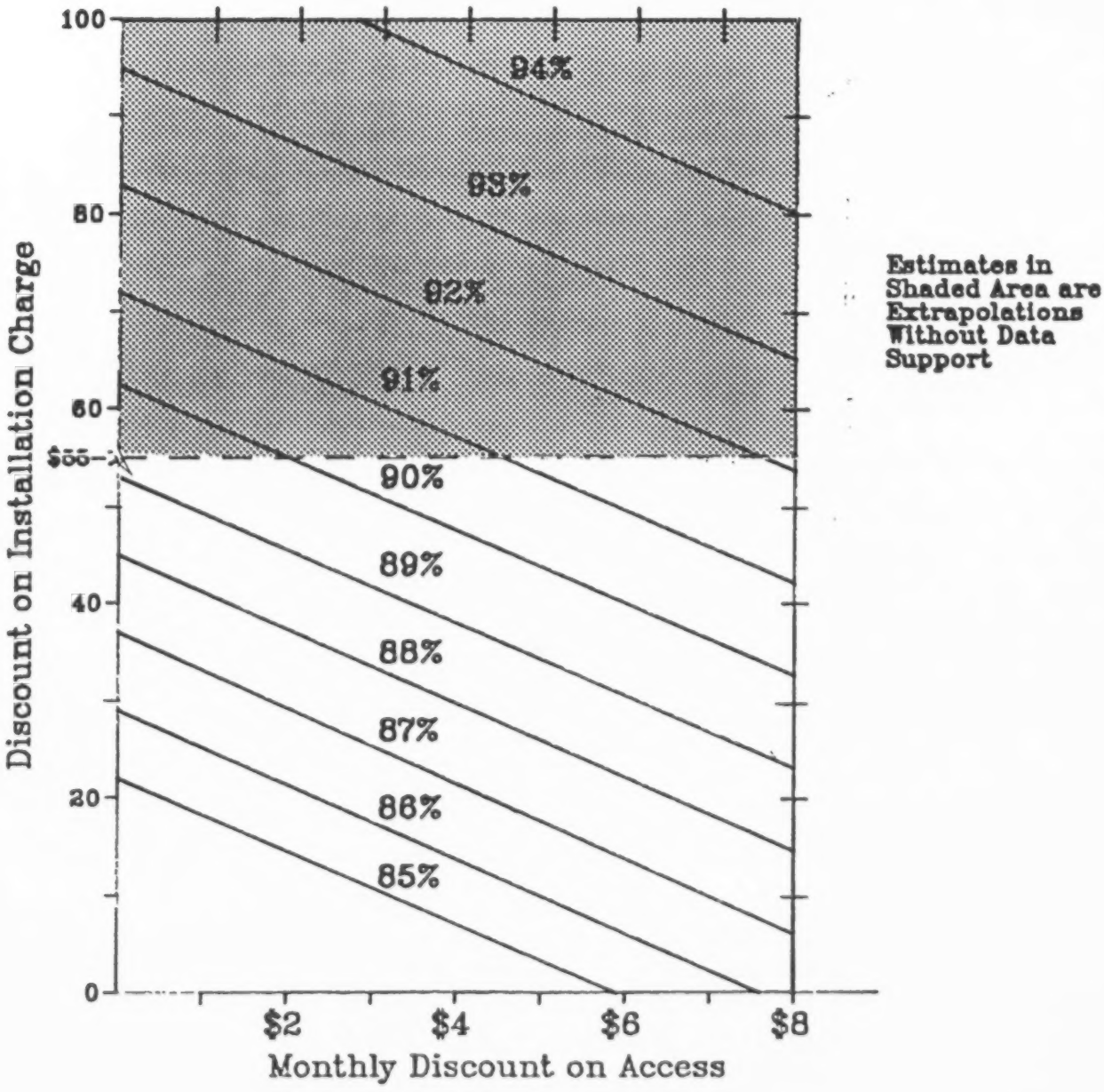
Each level of access discount and installation charge subsidies, based on the NERA model, yields differential penetration levels with decreasing marginal returns. For example, a $79 annual benefit package ($55 installation discount and $2 monthly access discount) increases low-income penetration by 8.3% while a $127 annual benefit package ($55 installation discount and a $6 monthly access discount) increases low-income penetation by 9.7%. Providing just a $55 installation subsidy yields an increase in low-income penetration rates of 7.5%.[9] Access subsidies provide incrementally smaller increases in low-income subscription levels.

---

[9] Since the Illinois Bell Telephone Co. charge for the service order and line connect is $55, only a $55 subsidy is assumed in the calculation of the installation charge.

Low Income Subsidies

Lines of Constant Penetration of Low Income Households



Current Penetration 81.7% of Low Income Households

Source: Illinois Bell Telephone Co.

Subsidizing the fixed upfront cost component of telephone service indicates the potental for increasing low-income household penetration to levels closer to the statewide average access rates. Varying the monthly access discount is the subsidy mechanism that can bring low-income subscription rates up to the statewide average but on a less cost-effective basis per percentage increase in low-income subscribers.

Tables I through III provide cost estimates of various subsidy combinations and their impact on subscription levels of current low-income subscribers and non-subscribers. These cost estimates associated with each subsidy level are derived to provide comparable baseline subsidy cost flows. They do not represent the total costs of a lifeline program or net revenue requirement impacts. All costs associated with a lifeline program will be dependent on participation rates which in turn may be sensitive to the administrative and certification steps adopted by any proposed program.

Actual subsidy costs of a Lifeline program should decrease as non-subscribers use installation discounts to join the network. These lifeline participants will still be recipients of monthly access discounts but they will begin contributing to retail revenue requirements. If used as a transitional mechanism to increase low-income suscribership in the short-run, total telephone system revenue may increase in the long-run.

Table I
Subsidized Low Income Service
Analysis of New Customers
Summary of First Year Subsidy

Monthly Access Subsidy	Annual Installation Subsidy	New Subscribers (thousands)	Installation Subsidy ($mill.)	Access Subsidy ($mill.)	Total Subsidy ($mill.)
$0	$50.00	41	2.1	0.0	2.1
$0	$55.00	44	2.4	0.0	2.4
$0	$100.00	68	3.7 (1)	0.0	3.7
$2	$25.00	28	0.7	0.7	1.4
$2	$27.50	30	0.8	0.7	1.5
$2	$55.00	49	2.7	1.2	3.9
$2	$100.00	71	3.9 (1)	1.7	5.6
$4	$0.00	14	0.0	0.7	0.7
$4	$27.50	36	1.0	1.7	2.7
$4	$40.00	44	1.8	2.1	3.9
$4	$55.00	53	2.9	2.5	5.4
$4	$100.00	74	4.1 (1)	3.6	7.7
$6	$0.00	20	0.0	1.4	1.4
$6	$27.50	41	1.1	3.0	4.1
$6	$55.55	57	3.1	4.1	7.2
$8	$0.00	26	0.0	2.5	2.5
$8	27.50	46	1.3	4.4	5.7
$8	55.00	61	3.4	5.9	9.3

Notes: (1) Since the charge for the service order and line connect is $55, only a $55 subsidy is assumed in the calculation of the installation subsidy.

Source : Illinois Bell telephone Co.

Table II
Subsidized Low Income Service
Analysis of Existing Customers
Summary of First Year Subsidy

Monthly Access Subsidy	Annual Installation Subsidy	Eligible Subscribers (thousands)	Installation Subsidy (1) ($mill.)	Access Subsidy ($mill.)	Total Subsidy ($mill.)
$0	$50.00	479	4.6	0.0	4.6
$0	$55.00	479	5.0	0.0	5.0
$0	$100.00	479	5.0 (2)	0.0	5.0
$2	$25.00	479	2.3	11.5	13.8
$2	$27.50	479	2.5	11.5	14.0
$2	$55.00	479	5.0	11.5	16.5
$2	$100.00	479	5.0 (2)	11.5	16.5
$4	$0.00	479	0.0	23.0	23.0
$4	$27.50	479	2.5	23.0	25.5
$4	$40.00	479	3.6	23.0	26.6
$4	$55.00	479	5.0	23.0	28.0
$4	$100.00	479	5.0 (2)	23.0	28.0
$6	$0.00	479	0.0	34.5	34.5
$6	$27.50	479	2.5	34.5	37.0
$6	$55.55	479	5.0	34.5	39.5
$8	$0.00	479	0.0	46.0	46.0
$8	27.50	479	2.5	46.0	48.5
$8	55.00	479	5.0	46.0	51.0

Notes: All eligible customers are assumed to take advantage of the subsidy.

(1) 19% of existing customers are assumed to move in any given year. Customers who do not move in a particular year do not receive the installation subsidy that year.

(2) Since the charge for a service order and line connect is $55, only a $55 subsidy is assumed in the calculation of the installation subsidy.

Source : Illinois Bell Telephone Co.

Table III
Subsidized Low Income Service
Analysis of All Customers
Summary of First Year Subsidy

Monthly Access Subsidy	Annual Installation Subsidy	Total Partic. (1) (thousands)	Subsidy to New Subscr. ($mill.)	Subsidy to Existing Subscr. (2) ($mill.)	Total Subsidy ($mill.)
$0	$50.00	376	2.1	3.2	5.3
$0	$55.00	379	2.4	3.5	5.9
$0	$100.00	403	3.7 (3)	3.5 (3)	7.2 (3)
$2	$25.00	363	1.4	9.6	11.0
$2	$27.50	365	1.5	9.8	11.3
$2	$55.00	384	3.9	11.5	15.4
$2	$100.00	406	5.6 (3)	11.5 (3)	17.1 (3)
$4	$0.00	349	0.7	16.1	16.8
$4	$27.50	371	2.7	17.9	20.6
$4	$40.00	379	3.9	18.6	22.5
$4	$55.00	388	5.4	19.6	25.0
$4	$100.00	409	7.7 (3)	19.6 (3)	27.3 (3)
$6	$0.00	355	1.4	24.1	25.5
$6	$27.50	376	4.1	25.9	30.0
$6	$55.55	392	7.2	27.6	34.8
$8	$0.00	361	2.5	32.2	34.7
$8	27.50	381	5.7	34.0	39.7
$8	55.00	396	9.3	35.7	45.0

Notes: (1) Sum of current customers who take advantage of the subsidy and new customers. 70% of the eligible current subscribers are assumed to take advantage of the subsidy.

(2) 19% of existing customers are assumed to move in any given year. Customers who do not move in a particular year do not receive the installation subsidy that year.

(3) Since the charge for a service order and line connect is $55, only a $55 subsidy is assumed in the calculation of the installation subsidy.

Source: Illinois Bell Telephone Co.

Quantifying the household marginal increase in demand as it moves from one level to another in purchasing network access escapes easy econometric analysis. Yet, it appears that subsidies do supplement low-income household budget functions so that unfulfilled demand for telephone service is finally supplied. Telecommunication service increases the overall consumptive and productive capabilities of these households and leads to more efficient allocation of a household's time-valued resources.

VII. Conclusion

Local telephone service is characterized by externalities which are associated with the telephone network itself and by other externalities which accrue to society as a result of nearly all households having telephone service. These externalities represent increases in social welfare once realized.

Households can be viewed as both producers and consumers of commodities whether those commodities are time-intensive or goods-intensive. Low-income households effectively have the same value of telephone service as do other residential users, but have lower access to the public good provision of telephone service because of income constraints in trading-off time-intensive and goods-intensive activities. Supplementing household budgets through welfare transfer creates a price

incentive to acquiring telephone service. Because of the public good nature of telephone access, economic efficiency output dictates that externalities and social benefits be captured even though individual household decisions would not recognize such external benefits. Therefore, the provision of a Lifeline subsidy is an economically beneficial investment that results in positive social welfare gains.

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Telephone Subsidization in Rural Areas

by

Joseph P. Fuhr, Jr., Ph.D.

Associate Professor of Economics

Widener University

Chester, PA

Presented at the Fifteenth Annual Telecommunications Policy Research Conference, September, 1987

Not for Quotation or Citation.

IR013175

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Edward Zajec

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Introduction

There has been considerable discussion concerning the impact of the divestiture of AT&T as well as other changes in the telecommunications industry on the rural telephone companies. Many rural telephone companies and their customers fear that this changing telecommunications environment will lead to substantially higher local rural rates and that many rural subscribers will no longer be able to afford telephone service. In this paper we look at a brief history of the Rural Electrification Administration in the telephone industry, the structure of the rural telephone companies[1] and their customers, and the subsidies which the REA borrowers have received and continue to receive. Finally, we examine the future of the rural telephone company and develop some public policies which will help achieve universal telephone service.

The wording of the 1934 Communications Act was "to make available, so far as possible, to all people of the United States, a rapid, efficient, Nationwide and worldwide wire and radio communications service with adequate facilities at reasonable charges."[2] This is the so called "universal service" mandate and suggests that when possible people should be able to receive telephone service. In some cases the cost of providing this service may be so great that some people can not afford telephone service without some form of subsidization. However, no explicit mention of any subsidization system or whether subsidization should occur to achieve this goal is mentioned in the 1934 Act. V[illegible]s subsidization programs have been implemented in the hopes of achieving universal service.

One factor which seems to have an effect on the cost of providing telephone service is the density of subscribers. Other factors equal,

it costs more to provide service the lower the density of subscribers. Thus, rural areas, where density is generally low, have higher costs of providing service on average than urban areas. Rural areas have historically been subsidized in three ways: the Rural Electrification Administration's (REA) capital subsidy program, the separations and settlement procedures and long distance price averaging. Since divestiture two other policies have been developed to help subsidize rural customers, the Universal Service Fund and life-line rates. The life-line rates are not specifically set up to subsidize rural telephone companies, but rather are a subsidy targeted at low income subscribers. Since some rural customers are low income, they are eligible for this subsidy.

History of REA in the Telephone Industry[3]

On October 28, 1949 Congress expanded the Rural Electrification Adminstrator's (REA) authority to make funds available to rural telephone companies. This program was similar to the one set up in 1935 for rural electric companies. The funds are to be used to serve rural towns with population of 1500 or less. From 1949 - 1973 the interest rate for borrowing funds was 2%. The Rural Telephone Bank (RTB) was established in 1971 which amended the Rural Electrification Act and is a supplemental source of financing for the rural telephone systems. The method for determining the RTB interest rates for borrowing funds is complex.

> Under this method, the Treasury furnishes the RTB with an interest rate each month. This rate is the 50-year rate RTB pays Treasury for funds borrowed by the Bank. Using standard regression procedures, known as the "least-squares" method, the rate on Treasury borrowing is projected a year into the future based on the trend over past months. This projected rate, together with the very low 2 percent interest rate on Class A stock (of which $477 million has been purchased by Treasury since

1973), the Bank's margins, and Class B stock form the basis for the appropriate level of interest necessary to determine the average cost of money to the RTB".

The RTB rate for Summer Quarter 1987 was 7%.

In 1973 , a major amendment to the REA Act established the Rural Electrification and Telephone Revolving Fund (RETRF). This amended Act changed the interest rate on REA loans from 2% to 5%. However, the 2% was retained for special cases. Also, this amendment provided for REA to guarantee loans from other borrowers. Nearly all (86%) of the non-REA guaranteed loans have been made at the government's cost of borrowing plus 1/8 of a percentage point".

In 1950, 17 telephone companies with a combined subscribership of 29,100 borrowed at an interest rate of 2%. In 1985 around 5 million subscribers or 4.2% of people receiving telephone services were being provided by REA borrowing telephone companies. In fiscal year 1986, $311.2 million in long term financing was approved for REA borrowers of which $183.3 million was 5% REA loans and $127.9 million was funded through RTB. As of Septerber 30, 1986 over $5 billion of REA funds have been lent to telephone borrowers.

Since RETRF was established in 1973, REA has paid out more in advances to borrowers and in interest, than it has received in payments on loans. The RETRF obtains the difference from the U.S. Treasury directly or through the Federal Financing Bank at rates of interest greater than the interest rate charged borrowers. There has been some discussion of raising the rates to borrow money at least the government cost of borrowing money.

Structure of the REA Borrowers"

Next, we look at a profile of the REA borrowers. The REA borrowers consist for the most part of two types of firms cooperatives

and commercial. In 1985 there were 942 borrowers of which 250 were cooperatives and 692 were commercial companies. First, we examine the industry as a whole and then examine the two segments.

In 1985, the total operating revenue of the firms was $3.1 billion. Most of the revenues come from toll service. In 1971, 47.1% of the companies' revenues came from toll and 49.6% came from local service. Since then the toll revenue portion has grown every year in 1983 before divestiture the figures were 32.6% for local and 65% for toll. In 1985, 65.8% came from toll and access charges and 30.5% came from local. Also revenues have increased greatly from around $407 million in 1971 to the present $3.1 billion. From 1971 to 1983 Net Income or margin-regulated as a percentage of income have ranged from 12.1 to 14 whereas since divestiture the percentage has been 15.3 and 15.7 in 1984 and 1985, respectively. In 1985 the total amount of net income was $488 million.

In 1985 the median per subscriber local revenue was $156.37 per year or roughly $13 a month. The middle range was from $127.60 - $197.28 or roughly between $10.50 to $16.50 a month. The lower limit of the middle range is the 25th percentile and the upper limit is the 75th percentile. Thus, 25% of the companies have charges of less than $10.50 a month for local services, 50% have charges of less than $13 a month and 75% have charges of less than $16.50 a month. These charges are for all local services which includes other services besides local access and some local usage. Also, 90.1% of all REA customers have one-party service and 89.1% of residential service is one-party. The median number of subscribers is 2,076 and the median density measured in subscribers per route mile is 5.5. However, 11.2% of borrowers

have between 5,000 and 9,999 subscribers and 9.1% have 10,000 or more subscribers. The smallest firm has 182 subscribers and the largest has 145,474 subscribers. As for the number of exchanges, 250 borrowers have one exchange and the largest has 181 exchanges. The median number of exchanges is 3.

In 1985 the cooperative borrowers numbered 250 and $607 million in revenue of which $416 million or 68.5% were toll and access revenue. Net income or margin-regulated was 122 million or 20% of revenue. The total number of subscribers was 1.074 million and 98.7% of residential customers had one party service. The median number of subscribers was 2,510 and the median density measured in subscribers per route mile is 3.32. However, 14% of the borrowers have between 5000 and 9,999 subscribers and 8.8% have 10,000 or more subscribers. Total cumulative loans to REA cooperative borrowers as of December 31, 1985 was $2.6 billion of which $2.2 billion was REA loans, $388 million was RTB loans and only .7 million was guarantee commitments.

In 1985 the commercial borrowers number 692 and had $2.50 billion in revenues of which $1.627 billion or 65% were toll and access revenue. Net income or margin-regulated was 365.7 million or 14.6% of revenue. The total number of subscribers was 3.746 million and 86.4% of residential customers had one party service. The median number of subscribers is 1,902 and the median density measured in subscribers per route mile is 6.73. However, 10.3% of the borrowers have between 5,000 and 9,999 subscribers and 10% have 10,000 or more subscribers. Total cumulative loans to REA commercial borrowers as of December 31, 1985 was $4.9 billion of which $2.5 billion was REA loans, $1.7 billion was RTB loans and $679 million was guarantee commitments.

As mentioned above telephone companies which serve rural areas are

eligible for REA funding. Thus, large telephone holding companies who have companies providing service to rural areas are eligible for these subsidies. Table 1[7] shows that between 1980-1985, 75 telephone companies owned by 5 telephone holding companies with 1985 sales ranging from $135 million to $2.5 billion received over 25% of all REA funding and two of them, Contel and Alltel, received $414.5 million in funding which was 16% of all REA funding. Also, Telephone and Data Systems Inc. received over 68% of long term debt from REA funds[8].

As stated above the REA funds were to be made available to telephone companies serving rural towns with populations of 1500 or less. However, as Table 2[9] shows, 5 telephone companies, 4 of which are owned by Alltel are located in what REA calls urban/suburban, that is a telephone company serving more that 20,000 customers and with more than 50 percent of these customers residing within an MSA or CMSA of greater than 100,000 population[10]. These loans represent 4.5% of REA loan approvals in 1985. In each case over 60% of the population live in the MSA or CMSA. However, the other customers may live in a

Table 2

Urban/Suburban Telephone Borrowers Who Have Received Loan Approvals From REA Over 1980-1985

	Borrower ID	Borrower Name	MSA or CMSA Location	Holding Company?	Percent MSA or CMSA	Subscribers (1985)	Loans (80-85) ($ in M)	Cumulative Loans ($ in M)
1	GA334	ALLTEL Georgia	Athens	ALLTEL	61.68	21073	11.0	11.0
2	MI336	ALLTEL Michigan	Jackson	ALLTEL	65.50	35342	13.9	24.9
3	NC310	ALLTEL Carolina	Charlotte	ALLTEL	62.94	75781	47.1	72.0
4	PA328	Murraysville	Pittsburgh	ALLTEL	100.00	20300	10.0	82.0
5	PA331	Commonwealth	Scranton	no	68.08	145474	35.7	117.7

rural area and thus may be eligible for the REA loans. However, as Table 2 shows all of the customers of Murraysville, a subsidy of

TABLE 1

MAJOR 1/ TELEPHONE HOLDING COMPANIES AND THEIR SUBSIDIARIES WHO HAVE RECEIVED LOAN APPROVALS FROM REA OVER 1980-1985

Holding Company	Total 1985 Sales ($ in M)	Number of Subsidiary Borrowers Receiving Loans 1980-1985	Percent of All REA Telephone Borrowers	Loan Approvals to Subsidiary Borrowers 1980-1985 ($ in M)	Total Loan Approvals to All Telephone Borrowers 1980-1985
CONTEL Corp.	$2,556.6	13	1.3%	$241.6	9.3%
ALLTEL Corp.	$ 672.0	18	1.8%	$172.9	6.7%
Telephone and Data Systems Inc.	$ 119.1	25	2.5%	$ 98.0	3.8%
Pacific Telecom Inc.	$ 459.0	7	.7%	$ 91.5	3.5%
Century Telephone Enterprises	$ 135.1	12	1.2%	$ 54.6	2.1%
TOTAL		75	7.5%	$658.6	25.5%

1/ Defined as having gross revenues in excess of $100 million.

Alltel, live in the MSA of Pittsburgh, Pennsylvania, this can hardly be defined as a rural area.

Also, in some cases resort areas have been defined as rural areas and are eligible for REA funding[11]. Thus, we can see that there are many possible misallocations of funding in the present REA system of telecommunications.

Subsidization of Rural Telephone Companies and Their Customers

Next we examine the various subsidies which rural telephone customers may receive. As mentioned above REA lends money at a lower rate than its cost of borrowing. Table 3[12] compares the cost of borrowing from REA with the cost of the government to borrow funds.

Table 3

Fiscal Year	REA Loans*	Government Cost of Money**	Fiscal Year	REA Loans*	Government Cost of Money**
1936	3.00	2.630	1952	2.00	3.286
1937	2.77	2.535	1953	2.00	3.426
1938	2.88	2.521	1954	2.00	3.656
1939	2.73	2.888	1955	2.00	3.800
1940	2.69	2.482	1956	2.00	4.134
1941	2.46	2.413	1957	2.00	4.166
1942	2.46	2.228	1958	2.00	4.757
1943	2.57	1.883	1959	2.00	5.232
1944	2.57	1.728	1970	2.00	5.868
1945	2.00	1.716	1971	2.00	5.210
1946	2.00	1.773	1972	2.00	5.099
1947	2.00	1.971	1973	3.72	6.129
1948	2.00	1.868	1974	4.62	7.030
1949	2.00	2.051	1975	4.42	6.833
1950	2.00	1.888	1976	4.02	6.568
1951	2.00	1.951	TQ	3.88	6.581
1952	2.00	2.051	1977	3.88	6.441
1953	2.00	2.287	1978	4.36	7.366
1954	2.00	2.043	1979	4.27	8.882
1955	2.00	2.979	1980	4.37	9.836
1956	2.00	2.457	1981	4.38	12.456
1957	2.00	2.767	1982	4.46	12.082
1958	2.00	2.868	1983	4.88	10.869
1959	2.00	2.951	1984	4.88	11.383
1960	2.00	3.448	1985	4.88	10.383
1961	2.00	3.888	1986	5.00	8.193

* Weighted average interest rate Paid by Borrowers on REA loans approved during the fiscal year.
** Computed Annual Interest Rate on Marketable Treasury Issues.
Source: Monthly Statement of Public Debt, U.S. Department of Treasury.

BEST COPY AVAILABLE

cost of money was 9.193% yielding a subsidy of 4.193%. The average subsidy per subscriber was around $.63 a month or $7.56 a year. Using these data, the total subsidy amounted to around $36.2 million. This subsidy is considerably lower than it was in previous years when the difference between the government's cost of borrowing and the interest rate charges to REA borrowers was much greater for example: in 1983 the estimated subsidy was around $57 million.

Beside the subsidy on plant and equipment to build the rural telephone company, these companies and their subscribers have received considerable access subsidies. Historically, long distance usage subsidized access to the system. The cost of access is determined by a firm's non-traffic sensitive (NTS) costs. The NTS costs are fixed costs and are not a function of usage. However, part of the NTS costs are allocated to long distance usage. It was determined that the allocation should be based on relative minutes of use. In 1943 when the plan started the average allocation was 3 percent. The rationale was that 3 percent of the time the telephone was used for long distance and thus 3% of the NTS cost should be allocated to long distance. However, with advanced technology and the pleadings of state regulator commissioners whose main objective was to keep local rates low (actually access and local usage rates were bundled), the allocations were no longer based on relative minutes of usage but became a multiple of relative minutes of use. The Ozark plan implemented in 1970 used a weighted relative minute of use formula which nearly tripled the amount of NTS cost allocated to interstate. The allocation rose to average of 26%. However, these averages distort the figures because in some rural companies the allocations was around 85%. Thus, in some cases 85% of a local telephone

company's revenue was obtained from settlements. Again, the charges were not cost based because NTS costs are not a function of use. However, it is highly unlikely that 85% of the firm's cost was incurred in providing toll service.

Another form of subsidy has been the averaging of long distance pricing. The price of long distance calls were not based on costs. The system the Federal Communications Commission (FCC) has used and continues to use for pricing long distance involves message minute miles (MMM). Under this system, a phone call from two large cities in different states and two rural communities in different states that are the same distance apart and for the same duration would have the same price. The price is the same even though there is a difference in the costs. People in low cost areas, usually high usage routes (urban) are paying the same price as people in high cost areas, usually low usage routes (rural). Thus, rural areas are receiving a long distance subsidy as a result of this pricing system. Proof that per usage cost on high usage routes costs less than low usage cost can be shown by the entry of long distance carriers such as MCI and GTE-Sprint in the high usage routes. The only reason such firms would enter, in spite of high regulatory barriers to entry, is that price was considerably above cost and they believed they could make a profit.

The cross subsidy of high cost users by low cost users has also affected the separations and settlement procedures, mentioned above. Because the price mark-up above cost is lower for rural customers, they place more long distance calls then if the mark-up were the same as that of urban consumers. Also, because the mark-up is above cost

the price is higher for urban customers, they make less long distance calls then if they had the same mark-up as rural consumers. Thus, due to the averaging pricing system, other things being equal, the relative minutes of use of long distance is greater in rural and lower in urban than if they had the same mark-up. This pricing system increases the relative minutes of toll use in rural relative to urban and more interstate NTS costs are allocated to rural and less to urban than would occur under an equal cost plus pricing system. The rural telephone companies receive more revenue under this system than would occur under a cost based pricing system.

In 1984, the FCC started a new system which changed considerably the allocation of NTS. The FCC's access charge plan was implemented and attempted to move towards cost induced pricing by charging the customer for a portion of the cost of his access. The FCC's plan was to move gradually from the present Ozark plan and to more fully implement the access charge plan. First, the FCC put a cap of 25% on the amount of NTS costs that any company could recover from interstate usage. However, since this would cause large increases in access charges in companies who were currently receiving 85% of their revenues from toll the FCC decided to phase in this program. Starting in 1986, 5 percent point increments would be used as caps over an 8 year period to bring down the interstate level to 25%. Also, to help the high cost firms, the FCC in 1986 developed the Universal Service Fund. This fund was a subsidy to telephone companies with high NTS costs relative to the number of subscribers. The amount of subsidy received is based on various formulas that take into consideration the number of subscribers and the difference between the NTS cost of the firm per subscriber (average access cost) and the nationwide average

access cost.

> Telephone companies with 50,000 or fewer loops receive a subsidy of 50 percent of their NTS costs over 115% of the nationwide average but not greater than 150 percent. On the other hand, larger companies with more than 50,000 loops receive fund support covering only 25 percent of their nontraffic-sensitive costs over 115 percent but not greater than 150 percent. Both small and large companies receive fund support to cover 75 percent of their nontraffic-sensitive costs over 150 percent. (Companies with loop costs that are 115 percent or less than the national average receive no fund support.)[13]

Also, the universal service fund uses the nationwide telephone company average cost of capital. This overestimates the cost of rural firms who are borrowing from REA at a considerably lower rate than the average. Thus, the NTS costs of the rural companies are overestimated and the amount of subsidy is increased. These various subsidy systems are in place to ensure that rural telephone companies can continue to operate and charge low local rates. For example, the FCC has found that rates in rural areas tend to be lower than in urban areas.[14]

Subsidy and Universal Service

In November 1986, the penetration rate nationwide was around 92.4%[15]. In 1980 the latest year for which data was available for rural areas, the penetration rate was 90.5%[16]. In 1986, 96% of all farms have telephone service[17]. The present subsidy system is such that all rural customers receive this subsidy regardless of whether they need it or not to receive telephone service. Thus, the poor in urban areas (low cost) may be subsidizing the rich in rural areas (high cost). Such a subsidy system seems highly inefficient in terms of cost causation pricing as well as in terms of equity.

Also, all customers of rural telephone companies receive this subsidy including business customers. For example in 1985, over 586

thousand or 12.2% customers served by REA borrowers were businesses[18]. This does not include farms as businesses. Most farms in rural area come under residential subscribers. However, it has been shown that at current pricing levels the most important determinant of whether people receive telephone service is their income level. As Table 4[19]

Table 4

Percentage of Families With a Telephone By Income
Unit Penetration November 1986

Income	Percentage
Total	92.4
Under $5,000	72.3
$5,000-$7,499	83.9
$7,500-$9,999	86.8
$10,000-$12,499	89.6
$12,500-$14,999	90.8
$15,000-$17,499	93.4
$17,500-$19,999	94.6
$20,000-$24,999	96.5
$25,000-$29,999	98.2
$30,000-$34,999	98.7
$35,000-$39,000	98.6
$40,000-$49,999	99.2
$50,000-$74,999	99.5
$75,000+	99.3

shows only those people with incomes lower than $15,000 have penetration rates of less than 90%. However the rural subsidization system does not seem to be related to income. For example a general

manager of an REA borrowing telephone company did not initiate a life-line program because he did not believe that there were eligible individuals in his service area[80].

Conclusion

The current system of subsidizing rural telephone subscribers is inefficient and inequitable. The capital subsidy has gone to the "rural" telephone companies to decrease the cost of providing service. These companies are not always rural companies and in some cases are large holding companies. Also, some companies receiving the subsidy are in urban/suburban areas while others are in resort areas. These quirks in the system are not the real problem. The real problem is that the system itself which was implemented to subsidize high-cost areas (rural) customers regardless of their income. As has been shown the level of income is the most important factor in determining whether consumers receive telephone service. A system which subsidies high income and businesses is inequitable especially when low income, low cost consumers may be subsidizing these consumers. Also, all of the other telecommunications subsidy systems, except lifeline rates, such as settlements, average pricing of toll calls and the universal service fund for higher cost areas do not take the level of consumer's income into account.

The elaborate systems of subsidies for rural telephone services should be eliminated and replaced with a new subsidy system targeted at people who need a subsidy to obtain telephone service. These people generally have low income regardless of location or have moderate income and live in high cost areas. The current FCC life-line plan is

a move in the right direction. Thus, if the goal is to achieve universal service a subsidization system which takes into account both the level of income of the consumer and the cost of access should be implemented.

Footnotes

1. For this paper rural telephone companies are those companies which are currently receiving loans from the Rural Electrification Administration.

2. 1934 Communications Act, 47 U.S.C. 214.

3. Most of the information in this section comes from United States Department of Agriculture, Rural Electrification Administration, "A Brief History of the Rural Electric and Telephone Programs," December 1986.

4. Before the House Subcommittee on Government Information, Justice, and Agriculture, Statement of Harold V. Hunter, April 23, 1987.

5. U.S. Senate, Hearings before the committee on Agriculture, Nutrition and Forestry on Rural Electric and Telephone Revolving Fund Self-Sufficiency Act of 1983, March 20, April 12, May 15, 1984 (Statement of John Luke), p. 263.

6. Most of the data in this section is found in United States Department of Agriculture, Rural Electrification Administration, "1985 Statistical Report, Rural Telephone Borrowers."

7. United States Department of Agriculture, Rural Electrification Administration, Executive Summary of Proposed REA Lending Program Reforms, no date given.

8. Ibid.

9. Ibid.

10. Ibid.

11. Ibid.

12. A Brief History, p. 25.

13. United States General Accounting Office, "Telephone Communications: Issues Affecting Rural Telephone Service," March 1987, p. 24.

14. Ibid., p. 37.

15. Federal Communications Commission, Telephone Penetration and Household Characteristics for 1986 by Alexander Belinfante, March 26, 1987, Table 1.

16. Telephone Communications, p. 10.

17. A Brief History, p. 7.

18. 1985 Statistical Report, p. XVI.

19. Belinfante. Table 4.

20. Telephone Communications, p. 79.